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LISTER AS A SCIENTIST*

J. J. R. MACLEOD, M.B., CH.B., D.Sc., LL.D., F.R.S.

There are but few who realize that the great practical discoveries of Lister, by which he introduced the antiseptic and aseptic methods in Surgery, saving thereby hundreds of thousands of lives, depended very largely on the fact that he was an experienced scientific investigator. Louis Pasteur once said that "Fortune only favours the mind that is prepared," and to no man does this apply more aptly than to Lister, for without an extended experience in scientific research it is certain that he could not have applied to the treatment of suppurating wounds and to making surgical operations free of most of their risks, the wonderful bacteriological discoveries of that great Frenchman. The whole scientific world knew of Pasteur's discovery, that micro-organisms cause putrefaction, but Lister's was the only mind that was prepared, by his extended researches on inflammation, to realize that micro-organisms similar to those which cause putrefaction in dead matter, are responsible for causing inflammation and suppuration in living tissue, and to devise methods by which these could be destroyed—the antiseptic method. The true scientific attitude is further shown in the remarkable success with which Lister worked out, practically unaided, the numerous details necessary to make the antiseptic method applicable to all kinds of infected wounds. That this part of Lister's work demanded great scientific skill and a mind trained to benefit in the full from each new experience as it arose, is sufficiently evidenced by the fact that there were but few surgeons of his time who at first succeeded in applying his antiseptic methods, because they failed to grasp the scientific principles upon which they depended. They were mere copyists and could not comprehend the bacteriological principles involved in the use of carbolic acid, nor did they have a first hand knowledge, as Lister had, of the physiological changes which occur in the living tissues during inflammation.

It has seemed to me that it might be of interest to explain briefly what Lister's scientific researches were, and to consider the conditions under which they were carried out and then made use of in the solution of the problems of surgery. It is often said that research workers are born, not bred. Although in a general way this may be true, it is at least equally the case that there are many who inherit this priceless gift without being able to put it into practice,

*Address delivered before the Royal Canadian Institute, April 30th, 1927, commemorating the centenary of Lister's birth.

through lack of opportunity and encouragement. Let us see, then, how in Lister's case the instinct for research came to be so magnificently developed.

Lister was born 100 years ago in Upton, then an outer suburb of London. His family were Quakers, and the boy was brought up and educated in all the rigors of this faith. A most important fact is that his father, a successful merchant in the city of London, was an enthusiastic amateur scientist. His interest was in microscopes, and this was aroused, it is said, by his observing, while yet a child, that he could see objects more clearly if he looked through a knot, an air bubble, in the window glass. He was short-sighted and the bubble acted as a lens, rectifying this fault in his vision. He pondered over the physical explanation and began putting lenses together to study their magnifying effects. The final outcome of his experiments was the discovery of the achromatic combination of lenses, by which the blurring and the colour fringes seen at the edge of highly magnified objects were replaced by a well-defined outline. Microscopes, were, therefore, no doubt constant topics of conversation in the Lister family and young Joseph soon became skilled in their use. He became interested in the structure of living things, but he did not restrict his observations to what could be seen only with the microscope, for he also studied the gross structure of animals and plants, making numerous most careful drawings of what he saw.

His years in school and in the Arts course at University College in London need not detain us. It was when he entered the medical classes of that University that he really found his place. Not only did he distinguish himself in the regular prescribed courses, but his bent for research was greatly encouraged and developed by contact with masters highly skilled in this field. It is interesting to note who some of these were: Lindley the Botanist, Thomas Graham the Chemist, and William Sharpey the Physiologist, all of them men with great reputations in their respective fields of science. Throughout his life, the collection and classification of plants was a constant hobby of Lister's during vacations and there exist, I believe, collections of his Alpine plants in certain of the museums of London. The training in Chemistry which he got from Graham, who, by the way, is to be considered as one of the originators of our modern science of physical chemistry, proved to be of inestimable value to Lister in that it enabled him in later years to choose with judgment and with a knowledge of their general properties those chemicals which might be most useful for use as antiseptics. But the greatest influence of all was undoubtedly that of Sharpey, who has justly been considered as the father of modern English Physiology. This interesting man, with his wide knowledge and his brilliant originality, appealed strongly to Lister, and being himself a most competent microscopist, he found in his young pupil an ardent investigator of the minute structure of living things.

While he was yet a student and attending surgical operations, Lister's enthusiasm to contribute something to knowledge found its opportunity at an

operation for the removal of the iris (the curtain of the eye) which was being performed by Wharton Jones, who also was an accomplished microscopist. Lister sought permission to examine microscopically the excised piece of iris so as to find out for himself whether it contained the peculiar involuntary muscle fibres that had recently been described by the great German microscopist Kölliker. By very careful study he was soon able, not only to confirm Kölliker's discovery, but also to go a step further, by showing that the muscle fibres are arranged, not only in a radial fashion, like the spokes of a wheel, so that by contracting they would cause the iris to narrow and the pupil to dilate, but also in a circular manner around the inner edge of the iris. He pointed out that it is by the contraction of these fibres that the pupil becomes narrowed. Although Lister had not time as a student to complete this investigation he did so immediately after graduation and on its publication it was accepted as a distinct contribution to knowledge. This was the start of his research career and he had not finished his work on the iris before he also became interested in the similar involuntary muscle fibres which form the muscles that cause the hairs of the skin to become erect (*arrectores pili*). These also had been previously discovered by Kölliker, who had used teased preparations of the skin for their study. Lister, realizing that by such a method the exact relationship of the muscles to the hair follicles could not be adequately studied, sought for a method by which this could be done, and his resourcefulness, ingenuity and technical skill are well exhibited in the method which he devised. At this time the microscopist did not have at his disposal the elaborate methods which are now in use for embedding fragile tissues in paraffin, so that extremely thin slices or sections of them can be cut without disturbing the relationships of the various structures, but Lister, knowing of the use of pith by the botanists for this purpose, applied the same principles for cutting sections of the skin. He placed a piece of scalp between two small boards which were clamped together and then laid aside to dry. During this process one surface of the scalp stuck to the surface of one of the boards, so that it became possible, with a sharp razor, to shave off thin sections. After allowing these to soak for some time in water, so that they swelled up again, he was able to examine the little muscles in their exact relationship to the other structures of the skin, especially to the hair roots or follicles, and his careful drawings are as good as any known to science in this connection.

But Lister was also deeply interested in what he saw in the wards, particularly in those of Surgery. He was appalled at the fearful mortality of gangrene and of suppurating wounds. He examined the various stages through which these conditions pass and began to wonder what the cause of inflammation and suppuration could be. Most surgeons at that time considered some suppuration of wounds as inevitable. They spoke of laudable pus. They felt helpless to treat the condition and they had made themselves familiar with what to Lister's mind was very strange and demanded attention and investigation.

With all this philosophical interest in his work, Lister did not neglect his regular studies. He graduated as the first man of his year, and the question arose as to what he should do next to prepare himself thoroughly for practice. His interest being very largely in Surgery, he was advised by Sharpey to spend a month with Syme the famous professor of Clinical Surgery in the University of Edinburgh, a lifelong friend of Sharpey's. He went to Edinburgh, but stayed in Scotland 25 years instead of a month, for he soon saw in Syme a man of outstanding brilliancy, skilful beyond his fellows in surgical technique and, above all, with an original mind devoted constantly to the problems of surgical practice. The attraction between the two men was a mutual one. Syme saw in the young Englishman talents and abilities far beyond the usual and a close professional, as well as personal, friendship quickly developed between master and pupil. For two or three years Lister's days were fully occupied with the duties of a house surgeon and when the time at last arrived for his assuming a more independent position this was fortunately found for him in the post of assistant surgeon to the Infirmary, which also entitled him to deliver a course of lectures in clinical surgery. Taking up house, after his marriage to Syme's daughter, at 11 Rutland Street, Lister immediately began to prepare himself for his lectures, and the manner in which he did this is of extreme interest and of far reaching consequences. He did not, as many would under the circumstances, merely prepare himself to summarize and discuss the written surgery of his day, but he proceeded to study for himself, the changes produced in the circulation of blood in the minute blood vessels by irritation of the tissues in which they lie, these changes being the first steps in the process of inflammation. In his spare hours, assisted by others he had enthused in the work, he examined under the microscope the blood vessels in the web of the frog's foot and he described carefully, with beautiful drawings, the changes which occur in them following irritation. He showed how the minutest of these vessels, the small arterioles and capillaries, contract immediately after being irritated but then, a little later, expand to beyond their normal size and become filled with blood, which although moving rapidly through them at first, afterwards begins to stagnate and finally to cease flowing with the minute blood discs or corpuscles clumped into little clots. His account of his researches in this field is a magnificent piece of pure research work, written in excellent style, and with beautiful drawings that of their kind have scarcely ever been excelled. Long hours were spent in the work, stolen out of those of a busy day in practice and extending over to the "wee sma' hours o' the morning". His companions had often to drop off from fatigue before Lister considered that the observation was complete, and this was all done so that he might lecture on information gained from first hand knowledge and not from text-books.

Two problems arising out of this work presented themselves to Lister's mind: (1) the reason for the clotting and stagnation of the blood and (2) the

explanation for the response of the blood vessels to the irritation. He published 5 papers dealing with the coagulation of the blood and the fourth of these was delivered in 1863 before the Royal Society of London as the Croonian Lecture. After describing the process itself—namely, that it consists in the appearance in the liquid portion (plasma) of the blood of fine threads of fibrin forming a mesh work which entangles the blood discs or corpuscles so that at first the blood sets into a homogenous jelly-like mass and then afterwards shrinks by squeezing out a clear fluid (serum) in which the contracted clot floats—he proceeded to discuss the various theories then held as to the cause for this process. According to one of these the liberation of ammonia from the blood when it comes in contact with the air was considered to be the cause of clotting. This he disproved, concluding finally that the real cause is “the influence exerted upon it (the blood) by ordinary matter, the contact of which over a very brief period effects a change in the blood”. When blood vessels, or other tissues, become damaged they produce the same effect as “ordinary matter”. He could not explain how living tissue prevents clotting (indeed, that is not known even at the present time) but it was of extreme importance for him to establish the fact that blood exposed to damaged tissue undergoes clotting. The importance of this observation in connection with wounds is self-evident: the clotting may be regarded, as a provision of nature to prevent further loss of blood by forming a solid plug for the vessel, but at the same time, it also furnishes dead animal material which, as we shall see later, may become fertile soil for the growth of micro-organisms.

Regarding the responses of the blood vessels towards an irritating substance, two distinct researches had to be undertaken. One of these had to do with the reason why the minute blood vessels over a considerable area might respond when only a minute spot of the tissue was irritated. Lister found this to be dependent on nerve connections and his conclusions, it may be of interest to state, anticipate those of modern work in this field of research. The other concerns itself with what at first sight may appear to be a problem far removed from that of inflammation, namely, the migration of minute pigment particles contained in the curiously shaped branching cells which lie scattered among the blood vessels under the skin of the frog and which, by their migration, make it possible for this animal, like the more famous chameleon, to adapt the colour of its body to that of its environment. The point of interest to Lister, as bearing on his main problems of the reaction of tissues to irritation, was to determine the factors which might alter this remarkable migration of pigment particles. He used it as a test of the viability of the tissues. He found that agencies which would cause inflammation also caused these particles to migrate, but that when the tissues were damaged the migration ceased to occur. He also found that the same conditions which produce paralysis of the movement of the pigment could stop the action of cilia, which are the microscopic hair-like processes on the cells lining various mucous membranes and which, by

their movement, produce currents in the fluids in contact with them so that they can cause small particles, as those of food, to be moved along.

I have ventured to describe those researches in some detail since they undoubtedly had a very great influence in enabling Lister to comprehend more clearly the problem of inflammation. They showed him quite clearly that the fundamental cause for the onset of this condition is irritation of the tissue sufficient so that the blood vessels become incapable of responding in a physiological manner. Lister himself considered his paper on the migration of the pigment particles as one of his most important pieces of scientific work.

In 1859, having gained many friends in Edinburgh and acquired a wide reputation as an investigator, as evidenced by his being made a F.R.S., he was elected to the Chair of Surgery in the University of Glasgow and here begins the third phase of his scientific career. This professorship did not carry with it any facilities in the surgical wards of the hospital, so that for the first year in Glasgow Lister occupied this time with private practice and in preparing his lectures. These became very popular and when, in about a year after his arrival in Glasgow, a vacancy occurred in the position of Surgeon to one of the chief surgical wards of the Infirmary, the students pressed his claim to the post in a petition with over 160 signatures. The authorities could not resist and now Lister, for the first time, became entirely responsible for the surgical treatment of the patients under his charge. It was a responsibility which weighed heavily upon him and well it might, for the death toll of the surgical ward patients from hospital gangrene and suppuration was appalling. In a large commercial city like Glasgow accidents are frequent, more particularly bone fractures. Lister was impressed with the fact that when the skin was intact fractures mended readily and without complications, whereas when the skin was also broken suppuration inevitably set in, followed very often by gangrene from which not more than 50 per cent. of the victims survived. Ever since his student days in University College Lister had pondered over the cause for these results, and now, in the light of his observations on inflammation, he was persuaded that some irritating agent acting on the damaged tissue must be responsible. He thought of the possibility that this agent might be of the nature of fungi.

About this time (1865) Pasteur's brilliant researches on fermentation and putrefaction had come to be generally known in the scientific world and Lister's colleague in the Chair of Chemistry, knowing of his problem, called his attention to the papers in which the results were published. It did not take Lister long to realize that here at last the key to the hidden mystery of septic wounds had been found. Space will not permit of any description of Pasteur's researches, but it may assist the reader if we briefly state one of the crucial experiments by which it was shown that putrefaction of dead material is due to the presence of micro-organisms in the atmosphere. In this experiment putrescible liquids, such as milk or beef broth, were placed in glass flasks

having the necks drawn out and bent over like a goose neck, so that the open ends pointed downwards, thus admitting no particulate matter from the air. No putrefaction occurred in the liquids on standing, provided the flasks and their contents had previously been heated to a high temperature so as to kill any micro-organisms originally present, *i.e.*, sterilized. If, however, the neck of a flask was broken, putrefaction of its contents very quickly set in, the rapidity of this process being related to the purity of the atmosphere in which the flask was opened. He showed, for example, when this was done in the pure air on the top of a mountain that putrefaction, if it set in at all, did so only slowly, whereas in the dust laden atmosphere of the city this process inevitably started in a very short time. Not only did this experiment demonstrate that micro-organisms introduced into a liquid from the air was the cause for its putrefaction, but it also disproved the then current hypothesis that this process has to do with the presence of oxygen. In wounds also, surgeons had thought that if they could keep out oxygen, suppuration would diminish, although Lister had realized that this could not be the case.

Lister's problem, then, was to apply to patients with exposed wounds the principles by which Pasteur had shown that putrefaction could be prevented; but how was he to do this? He could not boil his patients, as Pasteur had boiled his flasks, nor could he prevent the micro-organisms gaining entry to wounds inflicted in the body workshops whence so many of the accidents came. He realized that he could adopt no method based on the principle of *asepsis*, or prevention of contamination of the wound, but must endeavour to apply one of *antisepsis*, in which the organisms would be destroyed in the wound by chemicals sufficiently powerful for this purpose and yet not causing serious damage to the living tissues. He had heard of a substance called carbolic acid being successfully used to prevent excessive putrefaction of sewage in Carlisle. He argued that the carbolic must act by destroying the putrefactive micro-organisms, and, obtaining some of this substance, he waited until a suitable case of compound fracture came under his charge, when he applied the acid directly to the wound. It immediately combined with the blood to form a crust but the treatment was not successful in this, the first case on which he tried it. It was very disappointing. In the second case, however, a wonderful result was obtained. The patient was a boy whose leg bones had been broken by being run over by a cart and the broken ends were sticking out from the wound. Having replaced the ends in apposition, Lister smeared the wound with crude carbolic acid and bandaged it up. In 4 days just at the time when suppuration usually set in, the boy complained of pain. Had the carbolic acid again failed? It must have been an exciting moment for Lister when he removed the bandages to find that the pain was merely due to the carbolic acid having irritated some of the healthy tissues, the wound itself being free of suppuration, as he could see by lifting up the scab of carbolic acid and blood. The boy made a splendid recovery. Victory had been won over suppuration but

another problem presented itself, how was the irritation caused by the acid to be prevented? It would take us beyond the scope of this article to tell of all the methods that Lister used to overcome this difficulty, which he finally did by using watery solutions of pure preparations of carbolic acid instead of the crude acid itself.

But here it is important to point out that the practical application of the antiseptic method did not consist merely in dressing the wounds with carbolic acid solutions, but also that it demanded an intimate knowledge of the bacteriological principles involved. During several years following the publication of Lister's results, many other surgeons tried to use carbolic acid to prevent supuration but with little success, since they were copying the details without comprehending the principles of the method. This naturally led to much controversy in the medical world, as to the efficacy of Lister's method, but he let his critics fight it out among themselves, while he himself went steadily forward, as a true scientist, improving technical details and applying similar principles in other surgical conditions. For example, another alarmingly fatal surgical condition in those days was that known as cold abscess, a common form of which (psoas abscess) is due to tubercular involvement of the spinal column. The pus produced by the tuberculosis burrows its way downward to the groin to form there a tumour which slowly enlarges until at last it either bursts spontaneously, or has to be opened to give relief. This event used to be the inevitable harbinger of death, for the tubercular pus became infected from the air with suppurating micro-organisms and a fearful purulent discharge set in, increasing steadily and ultimately sapping away the patient's strength. Lister's problem was to devise a way for opening these abscesses without allowing them to become contaminated with organisms. This he accomplished by first of all disinfecting the skin over the abscess with carbolic, then placing a piece of gauze soaked in this material over the swelling and puncturing from the edge with a long knife which had been sterilized. The results were entirely as he anticipated. The open wound no longer became infected, but instead the tuberculous discharge got gradually less and less until finally in a great many cases the wound healed spontaneously.

Here was another achievement, a distinct step forward, and it encouraged Lister to devise a method by which the surgeon might perform cutting operations, as for the removal of tumours, etc., without danger of the wounds becoming purulent. He considered that besides sterilizing his instruments and other things coming in contact with the wound he must also prevent the micro-organisms of the air from contaminating the wound during the operation, and for this purpose he invented the famous antiseptic spray. It was a kettle from which the steam was ejected in a fine spray mixed with carbolic acid, and this was made to play around the wound. It is only within the last 30 years or so that the method has been abandoned, since bacteriological research has shown that the danger of contamination

of the wound by micro-organisms in the air in a room which is kept thoroughly clean is negligible, provided the skin of the patient and the objects coming in contact with the wound are kept sterile. But as is so often the case in science, the methods used at first were more complex than necessary and the antiseptic spray with all its crudities and inconveniences must always remain as an important stepping stone in the history of modern surgery. By its use Lister made operations safe, and with the possible exception of anaesthetics, nothing in surgery has been of greater importance than this. But I need not go further into these details, they belong rather to the field of practical surgery than to that of science, the important point to bear in mind being that their evolution as practical methods was dependent on the scientific principles under which they were elaborated. Lister's trained mind knew how to discriminate between the significant and the insignificant.

Another problem of practical surgery that had been for some time attracting considerable attention was that of the ligation, or tying of large blood vessels. The usual method had been to tie them with silk leaving the ends of the ligature long and bringing them out through the skin wound so that after a week or so the ligature might be pulled out. In the light of present day knowledge this was obviously a most dangerous technique, for the long threads served as a pathway along which infection could travel into the deeper parts of the wound. Then again there was a fearful risk of (secondary) hemorrhage when the ligature was pulled off the vessel. It was indeed an anxious moment when the ligature was removed. To obviate these dangers various surgeons had tried other methods, such as the use of silver wire with the ends cut short, or compression of the vessel with long needles like those used for knitting, but neither of these methods was really successful, the silver wire being apt to cause unbearable pain and the needles being often ineffective to control the hemorrhage. Lister tackled the problem fortified by the knowledge that if aseptic precautions were taken, a ligature of some soft material might ultimately disappear by being absorbed into the tissues. His keen power of observation had shown him in one of the cases of compound fracture which he had treated by the antiseptic method that such absorption of dead material did ultimately occur in the tissues. In the case referred to he had noticed, on lifting up the antiseptic scab, a spicule of loose bone which could not conveniently be removed. He noticed that at first it was hard and dead and white, but that as time went on it gradually got more fragile and then later became flushed with pink, indicating that blood vessels had grown into it from the neighbouring tissues. It had become alive and was being gradually absorbed into the blood now flowing through it. This and other similar observations led him to investigate the possibility that the material of which ligatures are composed might also become organized and absorbed. Before attempting to use such ligatures on patients, however, lest accidents might occur, he resorted to experiments on animals. He tied the large artery in the neck of a horse.

Some weeks later the animal died from natural causes and Lister found that although the silk still remained almost entirely intact a sheath of new tissue had grown around it. He examined the silk very carefully with the microscope and found that the fibers were beginning to be eroded although the process was evidently a slow one. He sought for some other material which would be absorbed with greater rapidity than the silk. Knowing that other surgeons had at one time used ligatures made out of animal tissues, particularly catgut, with some measures of success, he next investigated this material. He did everything himself; he went to the factories in which catgut was being prepared, he tested the action of various chemicals on it to see which might best preserve its strength and yet not make it too brittle so that the knots would slip, and he watched with the microscope its absorption by the tissues. These investigations occupied several years and resulted in the adoption of chromicised catgut, which is now so extensively used for deep ligatures. As in Lister's other work so in this with ligatures, the application of his scientific training is clearly evident at every step.

In 1870 Lister was called back to Edinburgh to fill the chair of his old chief Syme, who had retired through illness. It is interesting that Lister's inaugural lecture dealt not at all with Practical Surgery but with the fundamental experiments of Pasteur. He showed numerous vessels in which putrescible liquids, such as milk, had remained without putrefaction for long periods of time, simply because provision had been made so that the micro-organisms present in the air could not fall into the liquid. In giving this lecture Lister evidently realized that for practical success he had to impress on the students, as well as his colleagues, the necessity of understanding the principles, before attempting to apply the practical details of the antiseptic method. In Edinburgh, as had also been the case in Glasgow, there were still many, especially of the older surgeons who did not only dispute his claims with regard to the practical value of the antiseptic method but who also ridiculed the microbial theories, upon which it depended, and through the next few years Lister occupied his time in trying to convert these "die hards" to his beliefs. His experimental researches were now devoted to the study of micro-organisms and in carrying them out he kept in close touch with Pasteur who generously guided him in the new science, so that, through great technical skill and perseverance, Lister succeeded in isolating from milk a pure culture of the bacillus which forms lactic acid (*B. acidi lacti*). It is true that at this stage Lister made the mistake of thinking that there was not a fundamental difference in micro-organisms of different forms (specificity), but when this was pointed out to him by Pasteur he was the first to admit his error.

He stayed in Edinburgh about 8 years, his antiseptic doctrine having meanwhile been accepted in most places, but not among the conservative surgeons of London. They continued to dispute his claims and they considered micro-organisms as mythical. Lister decided, therefore, to give up his agreeable

and lucrative position in Edinburgh to accept a minor one at King's College, London, so that he might preach his gospel in this last retreat of pre-Listerian surgery. In a very few years he accomplished this end, and the later years of his life, crowded with honours, were devoted to promoting the interests of science in medicine. Even after he became a very old man he continued to take an active interest in the rapid developments of Bacteriology, and when the Lister Institute was established, primarily for studies in this field, he wanted to know about everything that was going on in its various laboratories.

"The student of sanitary science must take up the physiologist's point of view. He must look upon the living body as a mechanism; a mechanism of curious origin and history and of marvellous complexity; the most wonderful of all machines; one before which the wisest of men stands very much as does the savage before the chronometer, ignorant of its origin, ignorant of its fate; but yet unlike the savage because without superstition and without fear; knowing that the body is nevertheless a mechanism, subject to natural laws and with all its parts co-operating to one end,—the life-keeping function of the whole. The living body is like a machine, also, in that it receives all its energy from without and is merely a transformer of energy; in that it is profoundly sensitive (as is a watch) to its environment—to heat, to cold, to mechanical injuries. This living machine may be well built or ill; of good timber or poor; it may be sound and flawless or defective in construction. These are accidents of birth or ancestry; effects of good feeding or bad, of normal living or abnormal."

William T. Sedgwick.

PERSONAL REMINISCENCES OF LORD LISTER*

E. ST. G. BALDWIN, M.B. C.M., EDIN.

Going, as I did, to Edinburgh in 1870 and attending the systematic teaching of surgery, which at that time had not been influenced by the antiseptic principles of Mr. Lister, while following his clinical teaching in the Infirmary, it was evident to me that we were standing at the epoch of a new era in surgery.

To us who were in immediate association with Mr. Lister, it was a constant astonishment how indifferent surgeons were to his work, which was, even in its earliest developments, already improving results by eliminating the fatal infections that took such a terrible toll of operation cases. The greatest trial that I think Mr. Lister had to bear was the neglect on the part of those who should have been the first to have recognized and valued the work he was doing, instead of which he received little but hostile, and would-be destructive criticism. Lister, however, bore himself throughout this period of opposition with cheerfulness, always working to improve the effectiveness of the antiseptic method of dressing.

The secret of his imperturbable temper and self restraint under provocation, I am sure, was the consciousness that he was right; for once he said to me, "The day will come when the man who does not practise antiseptic surgery will be the one to be criticised."

During my student days, I had the privilege of being present on one historical occasion, namely, the first time Mr. Lister used catgut prepared with chromic acid. Desiring to find some means of producing a catgut ligature that might be trusted to hold securely the largest arteries, he prepared some, treating it with chromic acid. One day after the conclusion of his hospital visit he took Prof. Kuster of Berlin, then visiting his wards, his house surgeon, and myself, to the Royal Veterinary College, where he placed the chromic acid ligation on the carotid of a horse. The ligature proved an unqualified success and its subsequent use became general.

During the early days of antiseptic surgery, new and unexpected things happened. I will relate one.

During the winter of 1875-6, when I was his house surgeon, a patient was sent to Mr. Lister from the medical house, suffering from empyema of the right pleura. He had already been aspirated four times. Mr. Lister opened the chest by incision and evacuated eighty ounces of pus which fortunately had not been infected by the aspirations. A rubber drainage tube was inserted

*Read before the Royal Canadian Institute, April 30th, 1927.

and a gauze dressing applied. For some weeks everything went well, when one day, while Mr. Lister was away at Christmas, the man informed me that the fluid was accumulating again. Percussion showing that his surmise was correct, I took off the dressing, when I found what I expected, the drainage tube was not functioning, having been occluded by pressure of the ribs. I, therefore, removed it, replacing it by a tracheotomy tube when there flowed out thirty-five ounces, not of pus, but of clear straw coloured serum.

On Mr. Lister's return I told him what had occurred, which greatly pleased him, as it was a remarkable confirmation of his teaching as to the reproduction of pus in Empyema, Psoas and Lumbar abscesses that had been either aspirated without being infected or opened without being effectively drained; for his teaching was that the serum came from the vessels of the wall when left unsupported by the withdrawal of the contents of the cavity, but that it was not until tension was re-established that pus was reproduced. How much he would have liked to have seen what I had told him I had seen, may be judged from the remark he made to me, "Mr. Baldwin, you have seen what no man has ever seen before." But it never entered his mind to reproduce the scene, which could so easily have been done, nor would I have liked to have been the one to suggest such a course to him.

In 1877 Mr. Lister went to London carrying with him his great revelation that he was so anxious the surgical world should receive, and which, if received, he knew would cause a beneficent revolution in both the science and art of surgery the world over, and it is now history his great principles did accomplish what he expected of them.

In conclusion, I would like to say a few words concerning Lord Lister's life and work viewed as a whole; what, I think is his true place, not only amongst the men of his own day, but all men, what he has done for the science to which he devoted his life's work; and lastly, the place that should be accorded him in the esteem and love of his fellow men.

Lord Lister was one of a class whose members are but few, even in the grand aggregate. At long intervals they appear, but they all have one distinguishing characteristic; this is a vision that enables them to perceive and understand what others only see; and what they see is usually, if not indeed always, some great principle or force operative throughout all Nature at all times. Such a man was Newton, who by his recognition of the part played by gravity, read the riddle of the universe in one aspect at least. Another was Watt who saw the secret of developing of controllable, and therefore of usable power, lay in the production of pressure. And now, Lord Lister, who by recognizing the cause of putrefactive changes in wounds to be the introduction into them of microbe life, giving rise to more or less systemic disturbances and very frequently death, was enabled to abolish that dread family of diseases by preventing their germs attaining access to his surgical wounds, and extirpating them from traumatic ones, when seen sufficiently early to do so.

Lord Lister, while a distinguished surgeon, was a man of great and varied attainments; we frequently heard him spoken of as "That eminent pathologist" and as an "accomplished physiologist." He was no mean chemist, and pursued botany as the science of his recreation. But the secret of his greatness lay in the fact that, above all, he was a philosopher. With him, to observe a phenomenon, was to seek its cause; to see a need, to seek to supply it; and with untiring energy, and ceaseless effort not to be satisfied until the problem had been solved. And so, I venture to think and hope, that he will one day come to be known as the great Surgeon Philosopher, the greatest the world has ever known.

If we would epitomize his work for surgery, we do not transcend the truth, I think, when we say that he has rendered possible the doing of any operation not incompatible with life; and in accomplishing this has enabled surgery to make the greatest advance it has ever made towards that goal to which it should ever be the aim of its professors to advance it;—the making of surgery an exact science and a perfect art.

If we judge Lord Lister's life and work from the view point of humanity as a whole, his record is unique. If we apply to him the rule which He Who united in Himself both Deity and Humanity formulated and Whose words and principles are always true in every relation in which they are capable of being fairly applied; by this standard Lord Lister will not be found wanting, for, in a very true sense, he has been the servant of all, and therefore, worthy of being acclaimed chief by all.

Closing School as a Means of Controlling Epidemics.—The successful control of epidemic diseases among schoolchildren requires: 1. Keeping the schools open, with the possible exception of sparsely settled rural districts when medical inspection cannot be obtained and where aggregation takes place only in the schools. 2. Careful daily or frequent periodic inspection of schools. 3. Careful provision for the exclusion of cases and contacts, emphasis being placed on clinical data rather than on fixed periods of exclusion. 4. Systematic home visitation. 5. Reliance on natural and physical cleansing rather than on chemical disinfectants.—*Public Health Reports.*

MY REMINISCENCES OF LORD LISTER IN EDINBURGH*

F. LEM. GRASETT, M.B. (EDIN.), F.R.C.S. (ENG.)

My personal recollections of Lister carry me back nearly sixty years. I matriculated at the University of Edinburgh in November 1869. In the early days of November 1869 two introductory lectures were given by two newly appointed Professors. Crum Brown had succeeded Lyon Playfair (afterwards Lord Playfair). He was an able chemist, yet his lecture has faded completely from my memory.

The next day in the same chemistry classroom in the old University buildings on the South Bridge, Lister delivered his lecture. He had been appointed by the Crown to succeed Syme, whose failing health compelled him to resign the chair of clinical surgery. Several reasons made the audience an unusually large one. A Glasgow Professor translated by the Crown to Edinburgh was, to many there, a persona grata; yet his work in antiseptic surgery was being noised abroad; at any rate the students were desirous of hearing about it; also the student body was that year larger than usual. I remember well the procession into the lecture room, the marked quiet during its delivery and the close attention given to it. I never listened to any lecture so intently before. The subject was all new to me. The facts were so clearly and logically set out that I thought there could hardly be any other side to the matter.

Lister was then about 42 years of age, just in his prime, with a commanding figure and a beautiful, thoughtful face. The earnestness with which he spoke increased the slight hesitancy of speech peculiar to him, yet adding force to his words. I think all who heard him speak that day felt a new era of surgical work and teaching had opened in Edinburgh. He claimed to be endeavouring to treat surgical cases in such a manner as shall prevent the occurrence of putrefaction in the part concerned. "If this be done," he said, "injuries formerly regarded in the gravest light become comparatively trifling and some diseases rarely admitting of cure terminate most satisfactorily in perfect recovery. The guiding principle of its practical details is the germ theory of putrefaction." The proofs of the theory were step by step traced up, going back to Harvey's law "*omne vivum ex vivo*" that all animals and plants are derived from eggs and seeds, that vitality is transmitted, never created. At this time in Edinburgh John Hughes Bennett, the able professor of physiology, was a strong upholder of abiogenesis, as were Huxley and Charlton Bastian. On the other side were many. The greatest of all these was Pasteur. Lister's experiments were very similar to Pasteur's. He showed us one—the introduc-

*Read before the Royal Canadian Institute, April 30th, 1927.

tion of fresh urine into flasks, some with contorted necks, some with straight necks, pointing out the difference in their behaviour, *shortly* after, and *months* after the fluid was introduced. Others tried these experiments and failed. Lister answered these failures by saying "Negative results are far less strong than positive." "It is easy," he said "to understand failure in such experiments consistently with the truth of the theory; it is impossible to understand success in any single instance consistently with the falsehood of the theory."

In 1870 Lister gave me a dressership. The first cases I dressed I used the Lac plaster with protective oil silk beneath. This plaster had replaced the putty used in Glasgow. Then came the gauze. I remember so well the first gauze dressing. Nearly all the night before Lister had toiled to get a small piece perfected to his satisfaction. He brought it to the infirmary and with his staff went to the laboratory and made a larger portion. Then he went to the operating theatre where he corrected a badly united fracture of both bones of the forearm, dressing the wound with gauze; such was his confidence in the gauze. Much the same material though impregnated with different constituents or with none, is used to-day. I never saw a poultice or lint and lotion used in Lister's wards, though they were in constant use by all the other surgeons during my student days.

The next year I became a clinical clerk. At this time numerous distinguished surgeons from the continent followed the daily ward visit. Lister, painstaking to a degree, explained the theory and minutiae of his dressings. His own countrymen were rarely seen. Annandale and Joseph Bell endeavoured, not very successfully, to use it. I suppose it was the old story—difficult for old dogs to learn new tricks. Chiene was a whole-hearted follower of Lister and in his absence took charge of the wards. A careful and most considerate Chief I always found him.

At the end of my clerkship Lister promised me to be his house surgeon for November 1873, yet urging me to be a house physician first. Dr. G. W. Balfour was good enough to make me his resident physician, so I went to Lister in 1874. Syme had 70 beds, but the Board of the Infirmary gave Lister only 54. This chafed Lister, who felt the loss of clinical material. The wards were the old High School converted into surgical wards. They were always overcrowded. I have slept 70 patients in 54 beds by putting several children in a bed, using mattresses between beds. In the newer wards of the other surgeons, with their lofty ceilings, conditions were much more favourable. Yet with the exception of one case of septicaemia following amputation of the breast, I never saw a case of blood-poisoning in Lister's wards. This was not the general experience in the Infirmary by any means. I am sure if Lister had not had the greatest confidence in the protective power of his system against such calamities, he would never have allowed me such overcrowding. As his house surgeon he frequently took me to his private operations; probably because because so few outside his actual staff were at that period capable of

giving efficient aid in antiseptic details. I then found he treated his humblest hospital patient with the same consideration that he gave to the proudest dames that sought his care.

Sunday afternoons were busy times in the wards. Lister, though of the Society of Friends, went to Trinity Church, a Scotch Episcopal Church of the old-fashioned sort. About two o'clock he would come to the Infirmary. Any cases that had not been overtaken in the pressure of the week's work were investigated, minor operations done. There were no visitors, so he often discussed points in the cases not possible on ordinary days. The bells were often ringing six when I walked to the gate with him. He never, I think, took out his horses on Sunday. Very pleasant indeed were those Sunday visitations; all his staff appreciated and enjoyed them much.

Much as I was with Lister I cannot remember his ever discussing religious belief with me, but I have every reason to believe that neither his scientific researches nor the high honours heaped upon him prevented his having "the blessed hope of everlasting life."

About this time he was summoned to Balmoral to attend Queen Victoria. She had an abscess in the axilla. He opened it under the spray, but found no drainage tube. He cut one from the rubber tubing of the spray, with good results. The Queen said she liked the smell of the Carbolic Acid spray. This pleased Lister much, as one of the many objections raised to the use of Carbolic Acid was the odour. His selection by Her Majesty showed the estimation in which his work was held. There were others on the Royal Scottish staff that well might, by age and experience, have been chosen to attend her.

By degrees his old pupils—especially his old house surgeons—were helping to spread his views. Cleaver had gone to Liverpool; Fleming to Glasgow; Knowsley Thornton to be with Sir Spencer Wells at the Samaritan for women in London; Beatson (now Sir George Beatson) to Glasgow; Mallock, his old Glasgow house surgeon was in Hamilton, Canada. I went to Toronto, where Baldwin soon followed me.

Before going back to Toronto Lister wanted me to go to Norwich to take charge of the hospital there and help Mr. Cadge, the well-known surgeon in the east of England, to become familiar with the practical details of antiseptic surgery. I had made all my arrangements to return home and so, with much regret, declined his offer.

In 1876 I read before the Canadian Medical Association the first paper on antiseptic surgery in Canada. Sir William Osler, who had been a fellow-student with me, was present. The subject was new to them. They were quite interested but hardly able to discuss it intelligently.

Baldwin (with Lister in 1875-6, and with whom I often talk over those old days) gives a striking case of a patient quickly recognizing the difference between the old and the new surgical practice. An old man whose right foot was amputated by Mr. Syme, came back to the Infirmary with a malignant tumour of

the tibia. Mr. Lister amputated the thigh. Some days after Baldwin asked him how he was getting on. He replied, "Oh fine." Then laying down the paper he was reading, said, "Eh man, but you have made grand improvements since last I was here." If his fellow-surgeons were very tardy in their recognition, his patients were not.

In 1877 Lister left Edinburgh for London. King's College offered him the vacant chair of Sir William Ferguson. I know he felt that London had been lukewarm, even skeptical, about him and his work. Here was a chance to convince them and let them see his grand results. Watson Cheyne and John Stewart, now of Halifax, Canada, went with him, loyal and devoted pupils both of them, perhaps the foremost among those whom Lister trained.

After I left Edinburgh in 1875 and came to Toronto I did not see Lister until 1886. I visited England in that year. I went to King's College and slipped into the theatre unobserved, I thought, while he was operating. I found time had changed him a bit; his brown hair was heavily tinged with gray, spectacles were necessary for operating. In all other aspects he was unaltered. I fancied perhaps he would not remember me, but after the operation was over he washed his hands in his usual deliberate manner and looking around the seats, said "Where is that fellow", smiling. He warmly shook me by the hand and made me promise to dine with him that night. After dinner was over Rickman Godlee, his nephew, and others, left the table, but Lister kept telling me all the changes and improvements that he had made, the difficulties he had overcome since I had been with him. So keen was he in telling me all this and so interested was I in listening, that the time passed away so that it was eleven o'clock when we went upstairs, to find only my wife and Lady Lister in the drawing-room. I think the absorbing interest in his great work made him oblivious to time and place.

All Canadians at the British Association in Toronto in 1897 delighted to honour him in every way. During that visit I saw much of him. He seemed to enjoy talking of the past; of his wife, to whom he was devotedly attached and of her sad and sudden death when travelling in Italy. I saw him only twice afterwards. I find his last letter was dated June 1907. In it he says that he is in infirm health, but it would give him much pleasure to see me at Park Crescent. Unfortunately I did not go to England that summer. Two years afterwards, when in England, I found he had gone to Walmer and his return was a matter of great uncertainty. Though his niece said she thought he would see me, I hesitated to intrude upon him.

It is foreign to these recollections to offer any estimate of the benefits conferred upon humanity as the result of his work. I always think Mr. Bayard, the American Ambassador, most wisely judged, when at a banquet of the Royal Society, in proposing Lord Lister's health he said, "My Lord, it is not a profession, it is not a Nation, it is humanity itself which salutes you with uncovered head."

PASTEURIZATION OF MILK

JOHN W. S. McCULLOUGH, M.D.C.M., D.P.H.

THE term "Pasteurization" originated from the experiments of Louis Pasteur in France. In his experiments, beginning about 1860, on the "diseases" of wine, he found that heating for a few moments at temperature of 122° to 140° F. was sufficient to prevent abnormal fermentation and souring in wine. The same procedure preserved beer from souring. Thus arose the term "Pasteurization."

Applied to milk, pasteurization means the process of heating milk at a temperature of 142° F. to 145° F. and holding at this temperature for 30 minutes. The process is followed by rapid cooling to 40° to 50° F. and the milk should, if possible, be maintained at this low temperature until used.

Value of Pasteurization

The pasteurization of milk, when properly carried out, affords protection from disease-producing bacteria, such as those of diphtheria, scarlet fever, tuberculosis, the typhoid and paratyphoid group, dysentery, septic sore throat, and the colon group, which are carried in manure.

The need for pasteurization of the milk supply is amply proved by the numerous epidemics traced to milk. Trask reported 179 epidemics of typhoid fever from 1881 to 1907, of which 107 were in the United States, 51 epidemics of scarlet fever, 23 of diphtheria from 1879 to 1907, all traced to milk. There were 7 epidemics of sore throat in England, and since 1907 several epidemics of septic sore throat in the United States were shown to have been due to milk. Among these were the epidemics in Boston, Chicago, and Baltimore, and others in smaller cities.

Health officials all agree that pasteurization has been the greatest single safeguard in protecting the public against milk-borne disease. It has saved thousands of lives and prevented tens of thousands of cases of sickness which would otherwise have resulted from the use of raw milk.

It is usually conceded that pure raw milk if available, is the best. But it is equally true that neither in this nor any other country is a supply of pure raw milk to be had. Consequently pasteurization for the milk supply of cities and towns is not only desirable but essential to the lives and health of everyone, particularly of children for whom milk is so necessary.

In Canada there have been outbreaks of typhoid fever from this source in Winnipeg, Regina, Chatham, Vineland, and other places, and in 1927 there were over 5000 cases with upwards of 500 deaths from typhoid fever in Montreal, investigation of which proved that milk, infected by a carrier, was the origin of the epidemic.

Objections to Pasteurization

While the great advantage of pasteurization is that the milk so treated is rendered free of infection, the chief objection to the process has been that the heating destroyed the lactic-acid bacteria and that putrefactive organisms were left, which, when relieved from the restraining action of the acid-forming bacteria, would develop, forming toxins and putrefaction products. It was believed that the milk, because it was not sour would be consumed in that condition. Careful experiments in the Bureau of Dairy Industry in the United States by Ayres Johnston and others, show that such milk sours, but not so rapidly as raw milk and that a temperature of 145° F. for 30 minutes does not destroy all the lactic acid bacteria and that those which survive carry on the souring process.

Another objection is that bacteria grow faster in pasteurized milk than in raw milk. Again experiments have shown that the rate of bacterial growth is approximately the same in raw and in pasteurized milk.

It is said that in the use of pasteurized milk we are consuming the dirt and poisonous products, contained in the milk. If so, the situation is no worse than in the use of raw milk, since the raw milk contains more or less of such products.

The opponents of pasteurization assert that its use would cause lax methods of production for the reason that the farmers, knowing the milk was to be pasteurized, would be careless in its production. Such an objection could only be overcome by rigid inspection which in the milk to be pasteurized is just as necessary as for raw milk. Pasteurization was never intended to take the place of close supervision of the production. It is meant to supplement all other safeguards.

It is asserted that the heating of the milk produces changes which make it indigestible for infants. Rupp has shown that the heat of pasteurization does not cause any chemical change in the milk, that soluble phosphates do not become insoluble and that the albumen does not coagulate. Babies fed on pasteurized milk compared with those fed on raw milk, according to Wild, made slightly greater average gains. Any tendency to scurvy is prevented by the use of orange juice, tomato juice or potato water. Of the vitamins the fat soluble "A" and the water soluble "B" have been found to be quite resistant to heat and pasteurization has little or no effect upon them. The antiscorbutic vitamin "C" is quite sensitive to heat above 122° F. For this reason it is advised that in infants the use of pasteurized milk must be supplemented by the juices already mentioned.

Supervision of the Process

The process of pasteurization must be fully supervised by those who have a thorough knowledge of its primary object, *i.e.*, the destruction of disease-producing bacteria, and the handling of the pasteurized milk must be carried out in such a manner that it cannot be reinfected.

The primary object can be accomplished by heating the milk for 30 minutes

at a temperature of 145° F. It is then only necessary to cool the milk immediately over thoroughly cleaned and sterilized coolers, to run it into sterile bottles and to cap these with sterilized caps, and place the milk in low-temperature refrigerators for distribution.

The process looks simple enough but at every step problems of possible defeat may be met. Milk is a fine medium for bacterial growth. All pipes and appliances must be subjected to steam sterilization, there must be no leaky valves, dead ends or pipe lines which hold milk below the pasteurization point. Since foam in the process may reinfest the milk after pasteurization it is necessary either to eliminate the foam or to keep it at the pasteurization temperature. If it is not possible completely to eliminate foam by means of changes in equipment, the foam may be sufficiently heated by the introduction of steam above the body of the milk in the vat.

In the entire process of pasteurization, cooling, bottling and capping, the greatest care should be taken that the milk does not come in contact with human hands and that there are no opportunities for fly infection in the plant.

Pasteurization of milk, when properly done, destroys about 99% of the bacteria. The milk after being pasteurized should be cooled to about 40° F. If kept at this temperature, the bacterial rise in 24 hours will be but slight. If the milk rises much in temperature, bacterial growth will progress and the milk will sour and be unfit for use.

Cost of Pasteurizing Milk

Even with the rise in prices of coal, labour and equipment to 50% above those of 1913, Bowen in 1922 estimated that the average cost of pasteurizing one gallon of milk was about \$0.0049 or a little less than one-half cent.

Extent of Pasteurization

The first city to employ pasteurization on a considerable scale was Chicago, where the process was first enforced in 1908. In 1915 milk was pasteurized in about 62% of United States cities, with a population of 10,000 and over and in 1924 in about 89% of such cities. The City of Toronto was the first one in Canada to utilize pasteurization on a large scale and now a large proportion of Ontario cities have adopted the process to a greater or lesser extent. It is a significant fact that the greater the extent to which this process is used, the lower is the mortality of infants and it is further significant that not a single municipality adopting pasteurization has abandoned it. Up to 1920 information collected throughout the United States and Canada shows that there were at that date approximately 4200 pasteurization plants in operation. There is probably a large increase in this number at the present date.

Intensive study has been given to the subject on this continent and in England. Since 1919 a Committee of the American Public Health Association has had the question under consideration, and several reports have been published. The report for 1920, among other things, says:

"The results of scientific workers on the effect of pasteurization on the composition of milk indicate that there is little, if any, change in the chemical composition so far as can be determined by chemical analysis. A large amount of experimental work has been conducted on the undesirable effects caused by pasteurization on milk that is to be used for infant feeding. Some conflicting opinions have resulted from this work but it is now generally recognized that any ill effects from the use of such milk for infant feeding can be easily remedied by the addition of certain common substances, such as orange juice and potato water. The protection that pasteurization affords older children and adults from communicable diseases far overshadows any of the easily remedied ill effects associated with infant feeding."

The Report of a Committee of the Canadian Public Health Association, made after an exhaustive study of milk conditions in Canada (1925) says: "In the light of present day knowledge, no public supply (of milk) can be considered safe from tuberculosis, diphtheria, septic sore throat, typhoid fever, scarlet fever, and other milk-borne infections unless such milk has been scientifically pasteurized."

The same report referring to tuberculin-testing *vs.* pasteurization, says: "While the tuberculin-testing of all dairy herds is advocated it must be clearly understood that tuberculin-testing is not a substitute for pasteurization, and public authority must seek to correct the idea which is growing up in the public mind that pasteurization and tuberculin-testing are alternative methods of protecting milk supplies. If we have no pasteurization, tuberculin-testing is a definite and necessary advance, but if we have pasteurization, provided we are assured that it is scientifically carried out, tuberculin-testing is no longer an essential from the public health view-point."

There might with equal truth have been added the explanation—tuberculin-testing, in the absence of pasteurization is a measure which affords a certain protection, not a complete one, against milk-borne tuberculosis and nothing else, whereas, *pasteurization affords a sure protection not only against tuberculosis but also against a large number of other infections.*

The Medical Research Council of the English Ministry of Health has devoted a good deal of attention to the subject of pasteurization, particularly in respect of the ability of this measure to destroy the tubercle bacilli and other organisms in the milk. The conclusions reached coincide with those of Canadian and United States authorities and already a considerable proportion of the milk sold in the larger cities of England is pasteurized.

Pasteurization of Milk in Ontario

The inauguration of milk protection in Ontario is in the hands of the municipal authorities and is anything but satisfactory. While the installation of public water supplies is in the same hands the control of the latter utility has for many years rested with the Provincial Board of Health (now Department of Health); and that body and its successors, in the case of inadequate or faulty supply, has the power to force the local authorities to make improve-

ments. This end is usually secured by moral suasion and methods of education, but there are well-known instances where the Provincial Board forced the issue and compelled municipalities to adopt measures to guard the public against water-borne disease. The Report of the Board for 1925 shows that previous to 1913 there were but 7 water purification plants in the Province, while in 1925 there were 41 such plants and 96 chlorination installations. In that period the annual waterworks expenditures in cities of the province have increased from \$183,689 to \$4,594,274 (1924). The typhoid death-rate for the towns and cities in 1910 was 31.5 while in 1924 it was only 2.5 per 100,000 of population. If similar control existed in respect to milk supplies, the discovery of contaminated milk in a municipality would justify the controlling authority in taking the same measures which have gained such valued results in regard to public water supplies. In most of the urban municipalities of Ontario and indeed throughout Canada where lack of supervision of milk supplies and the absence of pasteurization exist, the milk supply is a standing menace to the public health and there is constant danger of outbreaks of disease on a scale comparative with that of Montreal last year.

What is true of the milk conditions in Canada seems also true of such conditions in the United States.

*The American Child Health Association in a recent report of milk conditions in 17 of the United States points out that in 117 small towns and cities studied, an average of 25% of the milk supplies examined contained 200,000 or more bacteria per c.c., while an average of 40% had 100,000 or more bacteria. Fifty-one cities gave a positive test for B.Coli in 50% or more of the supplies tested and 21 cities gave such a positive test in 75% or more. In only two places could 75% of the supplies be classed as "clean" or even "fairly clean."

Not one of the 117 towns and cities had 90% pasteurization and 97 of these communities had no pasteurization at all. These facts are in direct contrast to the large cities of the country as more than half of the cities with a population of 100,000 or over have 90% or more of their milk supplies pasteurized.

The experience of cities and of other communities which have for years employed pasteurization, public health, medical and scientific opinion practically all favour the use of pasteurization as an additional safeguard for milk supplies.

The objections to pasteurization are few and as already pointed out, may readily be overcome, and there seems no doubt that this measure in the protection of milk supplies is a simple, sane and desirable safeguard.

*American Journal of Public Health, p. 70, Jan., 1928.

SOCIAL HYGIENE--A BROAD CONCEPTION

DR. GORDON BATES

THE field of Social Hygiene is a very broad one as the very term itself would imply. Coming from two words of classical origin, "socius"—companion and "hygeia"—health, it might be considered to mean healthy companionship or healthy society. I take from the term also the suggestion that health is not a thing to be achieved by the individual alone, but that unless there is the co-operation of many individuals undertaking both individual and joint responsibility neither the health of the individual nor of society can be achieved.

I would also suggest to you that health is not merely physical but that social health, mental health, moral health and physical health are inter-related and inter-dependent. This I hope to prove to you during the course of this brief address.

Havelock Ellis who, as far as I am able to ascertain, wrote the first definite treatise on this subject, "The Task of Social Hygiene" in 1910 states that Social Hygiene is a development of the social reform and public health movements, and that a movement of this type has only become possible through advances in science and through further information, particularly in the field of biology during recent years. So that commencing with the suggestion that the building up of a fine race of people depends upon many considerations, not the least important of which is the co-operation and support in a great movement of the people themselves, I must, to give you a clear cut conception of both the fundamentals of the movement and its possibilities, give you first a historical résumé of what has been already accomplished in the direction of conserving human life. For, after all, that must be the great essential of a movement of this type, and may I in passing tell you that since the year 1850 the expectancy of life in this community has been increased from 40 years to 58, most of this advance having been made since the beginning of the present century. It is said that in the year 1680 the average duration of human life was something like 22 years.

All down through the ages there has, of course, been social reform. Changes in the structure of society have been brought about by the efforts of well-meaning people whose desire was an effort to bring a large measure of happiness and comfort to the members of the human race. On the whole, however, until the beginning of the last century science played a very small part.

In the last ten years of the 18th Century the first definite step was made in the direction of scientific life conservation. Edward Jenner, a physician practising in Gloucestershire discovered that the milkmaids in that shire

were generally immune from smallpox. He traced a relationship between this immunity and the fact that all of these girls had contracted a disease from cows, cowpox, on their fingers. The discovery of this relationship formed the basis for vaccination which, adopted in civilized countries, has eliminated a veritable scourge.

It is stated that in the reign of Queen Anne it was unusual to find a person on the streets of London whose face was not marked with smallpox. The mortality from this disease was heavy and the disease itself a terrible one. The contrast between the conditions which existed at that time and now is obvious.

No significant advances were made between the time of the discovery of smallpox and the work of Pasteur after 1870. During this period there was absolute ignorance as to the fundamentals of bacteriology and immunology, upon which most of the practice of modern medicine and public health is based.

Let us examine for a moment into what this meant. It meant first of all that the various communicable diseases raged, with no effective weapon with the exception of quarantine to combat them. It meant that the field of surgery was so restricted that abdominal operations were impossible. It meant that the simplest operation in the absence of any knowledge of the principles of asepsis might result in death from sepsis. The absence of knowledge of the necessity of cleanliness in all surgical operations was also responsible for the spread of puerperal infection in childbed hospitals so that we hear of stories of infection in those days ravaging surgical wards and childbed hospitals alike. Stories have been told of hospitals in which puerperal infection spread to such an extent that every mother in such hospital died, the infection being carried from patient to patient by the physician himself. Typhoid fever, scarlet fever, diphtheria, plague, tuberculosis, venereal disease and other communicable diseases made terrific inroads in the absence of any effective methods of controlling them.

But after the advent of Pasteur there came a change. Pasteur discovered that communicable diseases are passed from person to person by tiny organisms called bacteria and that for each specific disease there is a specific organism, that the habits of these organisms can be studied, that their methods of transference from person to person may be discovered and that the disease itself may be controlled by the acquisition of this new type of knowledge. One of the most important results was that Lister, a Scottish surgeon, after studying the methods of Pasteur applied his newly acquired information to the field of surgery and built up the whole new field of aseptic surgery. In the field of medicine there were many remarkable results which it is impossible to describe in detail here.

Let us take one or two examples. It was discovered that typhoid fever was caused by a specific organism, the bacillus typhosus. It was also found that typhoid fever, primarily an intestinal disorder was spread by the contamination of water supplies with the sewage from typhoid infected patients.

The result was that steps were taken for adequate disposal of sewage and for the purification of water and milk supplies with the result that in well organized cities, such as the City of Toronto, typhoid was eliminated altogether.

Or take another remarkable example. Yellow fever and malaria, veritable scourges in the tropics particularly, it was ascertained were conveyed by means of two types of mosquitoes. The discovery of this fact, one of the most dramatic pages in the history of preventive medicine, resulted in the deaths of numerous investigators before final proof of the authenticity of the theory was admitted. As you know it was originally believed that malaria was conveyed by the fogs rising from swamps, and that such diseases as yellow fever might be carried by means of so-called fomites, bed-clothes, dishes and utensils used by patients suffering from this disease. Both in the case of malaria and yellow fever volunteers were called for to prove that fomites were not responsible and that the death-dealing mosquitoes were. The volunteers,—I shall not describe the experiments in detail—were asked to occupy for protracted periods houses recently vacated by infected patients. They were kept in intimate contact with all the materials handled by the recently departed patients. But in the meantime all mosquitoes had been eliminated from the houses in question and mosquito-netting placed all over doors and windows. Neither malaria nor yellow fever could develop in a house such as this. Further experiments were necessitated whereby well-persons allowed themselves to be bitten by *Stegomyia fasciata* and *Anopheles* mosquitoes which had been known to bite infected persons. Both in the case of malaria and yellow fever infections resulted and as I have suggested there were some deaths.

The resultant new knowledge was applied in Havana by Gorgas who wiped out yellow fever by the simple procedure of cleaning up garbage, draining stagnant pools and putting mosquito netting on houses. This discovery also proved the very definite relationship between health and social organization. Applied in the Panama, a country previously known as the white man's graveyard, a district littered by the rusted machinery of Count DeLesseps who had failed in his project of building the Panama Canal because of the high death-rate among white laborers, it immediately made possible the completion of this great engineering project and exerted a material effect on the commercial organization of the world.

Applied in the field of diphtheria and certain other infections bacteriology made possible the development of the new science of immunology. Through this science one arrives at an intelligent conception of how the body protects itself against the inroads of disease. This development made possible the elaboration of antitoxins so one was able to say that in Diphtheria, for example, a disease in which the mortality varied from 30 to 50 per cent. were a child suffering from the disease given antitoxin early enough the diphtheria could not continue. Since this time a further discovery in this field, Toxoid, makes us now able to say that the use of three small doses of this substance,

hypodermically, in a well child will prevent diphtheria. The greatest task public health officials have in the control of diphtheria is not now the production of Toxoid, that is easy, but the getting of information across to people so that this important scientific discovery may be utilized.

I have suggested that the factors in the development of a healthy community are varied. It is true that the dissemination of scientific information is important. It is also true, however, that one should realize that the problem is not so simple as it seems.

Towards the end of the last century knowledge as to the spread of Tuberculosis made us see that not only was it necessary for us to understand the Tubercle bacillus but also that the conditions under which people live have much to do with the spread of this disease. Here it was obvious that long hours of work, overcrowding, slums, inadequate nutrition were decided factors both in reducing the resistance of the individual and providing means for the spread of the infection. In other words the social factor has much to do with the spread of communicable disease.

Meanwhile knowledge of biology was advancing and towards the end of the last century there had developed the new science of eugenics or racial improvement founded by Sir Francis Galton and others.

The doctrine which Sir Francis Galton and his followers enunciated was simply this, that by paying attention to the matter of mating it might be possible to improve the physical and mental qualities of the race, and of course the mental qualifications of mankind are as important as the physical.

At about this time investigations were commenced as to the transference of mental deficiency from generation to generation. A striking example of the information which was obtained by these investigations was the Kallikak family. Martin F. Kallikak, a soldier in the Revolutionary War, contracted an illicit union with a feeble-minded maid-servant, who was a servant in a tavern. This union resulted in a long series of descendants who have been traced for a hundred and fifty years. The list is composed almost entirely of persons of criminal proclivity, prostitutes, thieves, and murderers. After this union Martin F. Kallikak was married to the daughter of a distinguished revolutionary family. The result of this union has also been traced for one hundred and fifty years. The descendants of Martin F. Kallikak and his wife have been a credit to the United States. University Presidents, great merchants, great legislators have been characteristic of this strain. Not a single person in the entire list has ever been in prison.

The effects of feeble-mindedness have also been proved by other investigations.

Facts such as the above bring us face to face with the realization that something should be done in the direction of paying more attention to the matter of marriage and mating. It is obvious that unless some attention is paid to the mental factors in the production of social disabilities we will also suffer from the standpoint of health because crime and poverty bring slums and bad social conditions which make for disease in their train.

It was left for the present generation to deal with that most serious of public health problems, the Venereal Diseases.

Here was another type of disease neglected again because of the lack of scientific information. The *Spirocheta pallida* which causes Syphilis was only discovered in 1905, and the Wassermann reaction, a blood reaction for its detection, was elaborated only four years later. A realization of the ravages of the disease only came about because we were able to apply these new methods for its detection to persons many of whom did not know that they were infected. In the Toronto General Hospital it was found that 13% of all the patients were infected, in Montreal General Hospital 26% of all the patients were infected. Probably one-third were not aware of their infection. The result was widespread disability and death, the filling of hospital and institutional beds unnecessarily. Furthermore the disease was passed on to further generations.

Let me give you an example of this. In a city not very far from Toronto, one day a man came into the City Relief Officer suffering with rheumatism. He said that he was unable to work and that he required coal and groceries for his family. Fortunately the City Relief Officer had a realization of the fitness of things and referred this man to the hospital so that his rheumatism might be dealt with. A Branch of the Social Hygiene Council exists in this city and the Wassermann reaction as a routine has been adopted in the hospital. The result was that when the patient in question came up for examination his blood was examined and his case was diagnosed as Syphilis.

The nurse attached to the Venereal Disease Clinic was then sent out to bring in the rest of the family for examination. The result was that a family of nine persons was brought to light. All the members of the family were physically or mentally defective and none were self-supporting.

This entire family was syphilitic.

I could without much trouble give you numerous instances of families of this type discovered in all parts of the country.

This brings up to our mind many of the newer problems in the health conservation field and the field of social organization. Here was a family which had carried on in this community for many years. Its members had been the recipients of charity as long as they had been in the community. The younger members were destined to drift into provincial institutions for the care of the defective where they would linger at the expense of the state for years. And this condition of affairs had only been discovered more or less by accident although it is true that a certain amount of new social machinery in the form of a Venereal Disease Clinic and the Venereal Disease Prevention Act had helped.

Is not one faced with the conclusion that if disease of this sort is to be dealt with some new methods are advisable? Twenty years ago a clergyman had married one or two syphilitics and no one had taken the trouble to see that the two people concerned were fit to marry. Hence more disease, more disability, more poverty, more expense to the community.

Even after these two people were married surely it was possible to do something. This brings up a matter which has been the subject of thought by persons interested in health for a number of years in the possibility of Periodic Health Examination. If only we could persuade people to go to their physicians yearly for an over-hauling disease of this type would be nipped in the bud and much good would result. Such a procedure as this should apply, however, not only to Syphilis but to many other conditions as well. Tuberculosis and cancer are two other diseases which caught in their early stages may mean a life saved and they are only examples.

Decayed teeth, a condition which has been looked upon lightly in the past may be responsible for myocardial degeneration, high blood pressure and various other conditions which cause inefficiency, serious disability and perhaps death. Dr. Mayo, speaking before the American College of Surgeons in Montreal a little while ago, said that in a few years a yearly X-ray of one's teeth would be considered as a necessary routine by people who are anxious to conserve their health, and there is no doubt that in the future this will be considered as one of the necessary procedures in what will become an established custom, a yearly routine physical examination of each individual with the idea of building up the individual and hence a step made towards the building up of a fine, healthy race. Perhaps too, through the acquisition of knowledge by such means one may acquire information as to the possibilities of such a procedure. It may be wise for us to enquire as to just what is the condition of affairs with which we are faced as to the prevalence of known disabilities. Various investigations have been done upon this matter which would appear to prove that 2% of the population are continuously ill. In other words in Canada approximately 180,000 individuals are suffering from disabling illness every day. This results in a yearly loss of 21,000,000 working days to the community. When one considers that it is estimated that from 45-60% of disease is preventable one has some food for thought. One may add to this the statement that Professor Winslow has made to the effect that 29% of all deaths in the U.S. Registration Area are preventable. Any investigation in Ontario would appear to prove that in this province 34% of all deaths are preventable or at least postponable.

It is estimated that we have over 30,000 hospital beds, over 15,000 asylum beds and over 3,000 sanitarium beds in operation in Canada, a total of over 50,000 and that our capital investment in these institutions is over \$200,000,000.00 involving a yearly expenditure of \$50,000,000.00. The total cost of disease in Canada, is stated to be \$270,000,000.00 annually without taking into mind the most serious loss of all, the loss by death.

The indirect results of the wastage of which these figures are an index are very difficult to calculate. We have philanthropic institutions, homes, refuges, etc., without number which are necessary as a result.

One rather interesting index which may be applied is found in the Mothers' Allowance payments made in Ontario which involve an expenditure of something like \$2,000,000.00 per year. Such expenditures are made because of

the recognized seriousness of the broken home in creating extensive social problems with which we have been content to deal in the past by means of jails, reformatories and charity. The broken home comes from one of two causes, either death or separation of parents.

In a case in which Mothers' Allowances are paid there must be a mother with dependent children. Most mothers with dependent children are young mothers. Where the husband has died he was, generally speaking, a young husband. Therefore if he died of disease, ipso facto he died of a preventable disease. Would it not be wiser, rather than attempting to meet such a situation only by means of Mothers' Allowances, to put some strenuous efforts into the prevention of preventable death. The breaking up of a home by means of divorce is also a serious problem to which some consideration must be paid. The other day in the City of Detroit I saw a column in one of the most prominent city newspapers at the head of which appeared the caption, Births, Marriages, Deaths and Divorces, and that day there were as many divorces as marriages. In the United States more than one marriage in seven ends in divorce. Here is a matter where more education should be undertaken.

The neglect of the matter of preventable death in the later decades of life resulting in the broken home has other serious results as well and one will discover if one investigates that the problem of illegitimacy is also closely related to it.

The other day in the investigation of a series of illegitimate births in 31 young women it was found that in the case of 22 out of the 31 either one or both parents had died. Again the broken home caused by preventable death was at the bottom of a serious social problem. It may be convenient to blame the existence of prostitution on the innate viciousness of the individual. Fundamentally this social phenomena is caused by lack of parental control and too frequently the lack of parental control is caused by the separation of parents sometimes by legal process but far too frequently by death.

So that I have attempted to submit in this brief half hour some description of the problems of Social Hygiene, problems whose solution depends fundamentally upon our giving more attention to organization for the conservation of human life and health.

How are we going to go about it?

In the first place our machinery is as yet inadequate. In Toronto, we have been fortunate in having as our Medical Officer of Health, Dr. Hastings, a man who has achieved his reputation by courageously fighting for the right. In other cities and towns we are not so fortunate. In many parts of the country the problem is complicated by the non-existence of the health officer or by the existence of the part-time officer, a physician who is paid a pittance for devoting a small part of his time to the preservation of the health of his entire community and who is carrying on an extensive medical practice at the same time. Generally speaking the part-time health officer is not fully effective.

Governments, Provincial, Dominion and Municipal will go as far as public opinion will carry them in this direction.

The idea of periodic health examination has been approved by the organized medical profession and a committee of the Canadian Medical Association is at work on the details of a form to be used for this purpose. Public opinion, however, has not as yet been aroused. Periodic health examination cannot be effective unless our people are interested enough to come forward for examination.

Unquestionably other problems exist in the home. Education for parenthood is a matter to which no one has as yet given serious thought. If we have over 15,000 yearly deaths in the Registration Area of infants under one year of age it is at least partly due to the fact that parents are not sufficiently educated. That illegitimacy and Venereal Disease exist is to a degree from the same cause. If we are willing to build hospitals and institutions with many beds devoted to the care of persons suffering from diseases which could have been prevented it means that we are as a people not sufficiently educated. Similarly we tolerate a growing divorce problem and make no effort to educate young people for marriage and parenthood. It is too large a question to go into in detail here but I have no hesitation in saying that the divorce problem with all its resultant tragedies among children can be solved by a scheme of parent education calculated to teach young parents their responsibilities to their children both from the standpoint of health conservation and instruction in the pitfalls of life. Divorce prevention depends on the early education of the child in the home, choosing a mate is rather an important question in most people's lives. It should not be undertaken blindly.

If we are willing to neglect the fundamental causes of the social problems with which we are attempting to deal by charity again we are insufficiently educated.

The Social Hygiene Council commenced its work in Canada with the idea of making a Governmental programme effective. Much educational work has already been done. Committees have been formed in all parts of the country. A Publicity Service recently has been formed with the idea of keeping newspapers supplied with information in all parts of the Dominion. Here in Toronto the radio has been utilized weekly for two years. Gradually a staff of organizers is being built up to organize and help create public opinion in the various provinces. The moving-picture has been utilized and one moving-picture dealing with the problem of Venereal Disease has been shown to half a million people. With the co-operation of the Provincial Department of Health exhibits have been shown dealing with the various phases of the problem in all parts of Ontario. Recently an important development has been the creation of a Division of Education with the idea of working out a plan for parent education and a number of classes in parent education have already been started in the City of Toronto.

But the work must go a good deal further.

As a result of the activities which have been carried on so far a National

Board has been formed which includes most of the prominent health leaders in the Dominion. Some of the most prominent men in the social and financial world in the Dominion have come forward to act on a new Advisory Board. His Excellency the Governor-General, the Dominion Minister of Health and the Provincial Ministers of Health as well as Health Officers, have shown their interest.

What is to be the next step?

If we are to develop further into a great national organization for Social Hygiene in its broadest sense, backing up the constituted health authorities wherever possible, enlisting public support in all parts of the Dominion in measures which have to do with the conservation of life and health and letting people see that as parents and as citizens they have a distinct responsibility much more educational work must be done. Thus with the idea of giving you some conception of the reasons for action and the possibilities in the direction of building up a healthier and finer race this address has been prepared.

Given the co-operation and support of citizens generally we need put no limit upon the possibilities of the organization.

"The mode of propagation and the means of prevention of epidemic diseases require, as I said, increased investigation; and if any inducements were wanted to stimulate my present audience to that inquiry, it would only be necessary to remind you that, by investigating one of these diseases, a former Fellow of the Society was enabled to make the greatest discovery that has ever been made in the practice of medicine and to render the greatest benefit to his species which they have probably ever received. I need hardly say that I refer to Jenner."

From the Oration delivered at the 80th anniversary of the Medical Society of London in 1853, by John Snow, M.D.

EDITORIALS

LISTER DAY

APRIL FIFTH

ON April 5th, 1927, was celebrated throughout the medical world the centenary of the birth of Joseph Lister. The centenary was observed in each of the University centres in Canada and tribute was paid to the memory of one of whom Moynihan has said was "the greatest material benefactor the human race had ever known."

At a meeting of the Council of The Canadian Medical Association held at Winnipeg in June 1922, a resolution was presented that a Lister Oration should be founded in Canada to be given at the Annual Meeting of the Association every three years. In 1923 the Lister Memorial Club was formed to facilitate the collection of an endowment fund to defray the expenses incident to the carrying out of this proposal. Dr. John Stewart of Halifax, Nova Scotia, who had been a student clerk and afterwards a personal friend of Lord Lister's, was chosen to deliver the first Listerian Oration, 1924. The second Oration was given by Sir Charles Scott Sherrington, Professor of Physiology, Oxford.

To Doctor John Stewart must be given the credit of having conceived the idea of a perennial tribute to Lister in the form of a day of remembrance—"Lister Day." Through The Canadian Medical Association the day has been established in Canada, and not in Canada only, but also in the United States, through the ready acceptance of the idea by The American Medical Association.

The aim is to establish "Lister Day" in every medical school, every hospital, every health centre and every school throughout the world. And so, on April 5th, "Lister Day" will call to mind the memory of one whose name will never be forgotten.

THE PRESS AND PUBLIC HEALTH EDUCATION

VIEWING the tremendous advances which have been made in the field of scientific public health during the last twenty years one cannot but reach the conclusion that perhaps the greatest of our problems is the utilization of the vast store of information which we already have. Diphtheria, smallpox, syphilis, tuberculosis and in fact most of the ailments by which mankind is assailed—with the exception of old age—are all of them preventable. That is the public health man says they are preventable. Yet

in spite of the scientific knowledge upon which his statement is based, for all practical purposes the so-called preventable diseases are not preventable unless the education of the public is considered as a factor of major importance in the achievement of this end.

Given efficient health officials and a thoroughly co-operative press, mortality rates will drop as rapidly as the health status of a country improves.

There are some difficulties in the way. Health officials are generally physicians and the ancient code of ethics still prevails to a degree. Publicity is distasteful to the average physician—and this fact sometimes prevents him from entering into a campaign of public education to the degree which is necessary if he would achieve results. Again local newspapers may be apathetic. Unfortunately the spectacular appeals most to the newspaper man and he is much more likely to be interested in a Hollinger disaster or a theatre fire than he is in the matter of preventing diphtheria. Diphtheria deaths are an every day affair. Great fires or shipwrecks appeal more to the imagination and deserve more of the editorial and reportorial pen. However apathy can be broken down and fortunately, actual wrong-mindedness, in an editor, is unusual, although we do know of one editorial sanctum in Ontario in which sympathy for the irresponsible exponents of freak theories overbalances the judgment of the editor to such an extent that his editorial utterances are sometimes more likely to do harm than good.

Generally speaking, the health officer who desires to influence his public through the press will meet a ready sympathy from his local newspaper editor and the national agencies such as the Canadian Social Hygiene Council and the Canadian Medical Association which are now attempting to influence the public through syndicated articles on various phases of health will meet with prompt editorial support.

It is to be hoped that both nationally and locally efforts directed towards the informing of the public will be multiplied to such a degree that they will have a real effect on people's health habits. Great is the power of the press. The health officer should realize this fact and act accordingly.

CHILD HYGIENE

H. E. YOUNG, M.D. and J. T. PHAIR, M.B., D.P.H.

MATERNAL MORTALITY IN CANADA

THE report of the enquiry as to the factors influencing maternal deaths in childbirth, recently issued by the Federal Department of Health, presents for the consideration of every health worker a wide variety of interesting data. One statement in the report stands out, namely, that maternal deaths so called are more numerous among women from 15-50 years of age than deaths from any other cause except tuberculosis.

Canada is presumed to be extremely favoured in the academic qualifications of its medical and nursing profession; in the high standard of its hospitals; in the economic conditions of its people and in the absence of any midwife problem, yet the fact remains that the death rate from this cause is much higher than that existent in practically all of the Western European Countries. This unfavourable comparison calls for early and serious consideration.

It is assumed that certain factors definitely influence the number of deaths associated with pregnancy. What these factors are and how far-reaching they are individually or collectively is a question that warrants the thoughtful attention of those best informed on this matter. The report referred to, for example, emphasizes the necessity for pre-natal care, inferring that seventy-five per cent. of the deaths reported might have been avoided if satisfactory

supervision during pregnancy had been available. Whether such an inference is well founded in the group under discussion or not, the fact remains that in the larger centres in Canada, the United States and Europe, where such supervision is an integral part of the programme outlined for patients seeking admission in hospital clinics, etc., the death rate among those receiving such care is remarkably low. The report of the Victorian Order of Nurses, an organization which annually gives obstetrical nursing service to about seven per cent. of the women in Canada who are in need of such service, emphasizes the value of adequate pre-natal supervision. What does pre-natal care involve, and how may its more general adoption be brought about? Does the onus for its establishment rest upon the family physician, or upon the patient herself, or should its necessity be brought to the attention of the parties concerned by the agent of some interested voluntary organization or the local health authorities?

Pre-natal supervision is not a complicated procedure, but it does increase very materially under ordinary circumstances the cost of obstetrical service. The physician instead of seeing the patient for the first time in labour, is consulted periodically from the third month of pregnancy. This added cost un-

doubtedly influences the initiation of this service in all too many cases, in view of which fact it would seem that local health authorities, hospitals and even voluntary organizations interested in health work, are more than justified in making this service easier of obtainment for those situated in less fortunate financial circumstances.

The increased cost of obstetrical service which includes pre-natal supervision is not the only factor which is influencing its early establishment. Ignorance; a rigid adherence to ultra-conservative ideas; peculiar diffidence which all women associate with the pregnant state, and the apparently inherent desire to conceal their condition as long as is humanly possible from even those most intimately associated with them, all tend toward the delay in consulting the family physician or obstetrician.

To what extent the absence of medical service influences the maternal death rate is difficult to say. Accurate figures as to the number of unattended births in this country are not at the moment available. The percentage of deaths noted as due to this cause in the report previously referred to is greater than one would

anticipate, and is roughly one-seventh of the whole.

The advantage of the early hospitalization of a large number of those cases which prior to the expected time of labour were judged to be suffering from some slight abnormality, needs no elaboration.

Would better medical or nursing care during and immediately after labour have resulted in any appreciable diminution in the death rate? This question can only be answered by the profession itself. It would seem however that much might be done to allay the public alarm if the organized medical profession in every province gave the whole question the consideration its importance apparently warrants. It is difficult to arouse much sustained interest in the individual physician in any surgical procedure which has a mortality rate at its worst, or less than one per cent., yet when the subject is mentioned every physician deplores the fact that even one death occurs.

The report of the Federal Department is well worth careful reading, and it is to be hoped that it will stimulate in each of the provinces an increased interest in the solution of the problem.

EPIDEMIOLOGY AND VITAL STATISTICS

A. C. JOST, M.D. and NEIL E. MCKINNON, M.B.

OLD AGE DEPENDENCY

THERE has recently been issued a report on old age dependency prepared by the Industrial Welfare Department of the National Civic Federation. The report is a tabulation of the findings resulting from personal interviews with a block of 14,815 persons aged 65 years and over and residing in eleven cities and two towns. These communities were located in the States, New York, Pennsylvania, New Jersey and Connecticut.

The total population of the four states is in the vicinity of 23,640,000. Of that total there were in the age groups 65 years and over about 1,089,000 persons, a percentage therefore of about 4.6 of the population being contained in the age groups considered. The number interviewed, which was 14,815, was not much more than 1.3% of the whole group. This fact must be borne in mind when the deductions are considered. The possibility of error from such a small sampling must needs be high.

The study, however, is a very valuable one, in that it throws doubt on the accuracy of a number of statements respecting dependency in those of the higher age groups which have been commonly current for some time, for such a time at least that it seems to be somewhat difficult to determine on whose authority they first were made. Apparently the authors of the publication have not

themselves been able to trace some of these assertions to the sources, though they are quoted, and an attempt has been made to indicate recent publications in which they last appeared. In a general way, they are to the effect that an extremely high percentage (from 54% to 90%) of individuals aged 65 or over are dependent on relatives, friends or the public.

The conclusions reached as a result of the investigations of the Department are quite strikingly at variance with the older estimation. Its conclusions are that over 70% of the members of the groups referred to possess some means in the form of real estate or property and that half of those who have no property have incomes from earnings or pensions. Only about 17% are without property or income (2316 out of 13,985).

Particular attention might with advantage be directed to certain results of the investigation.

I. Inmates of Institutions (estimated at probably less than 3% of the aged urban population) were not interviewed.

II. The married were found to be as a rule less subject to dependency than were the single or the widowed.

III. The curve of dependency arose quite sharply after the age 65. Of the 13,785 for whom quite complete information was obtained (the number 1030 being the difference between 14,815 and 13,785 representing rural residents not fully reported on) about

1 in 5 of the men or about 2 in 7 of the women between 65 and 69 had no property. At age 85-89 or over the figures were 1 in 3 and 1 in 2 respectively for the sexes. Moreover, of men between 65 and 69, 18% had incomes of \$2000.00 a year or over, whereas only 3% of men aged 90 or over enjoyed an income of that amount.

IV. From the standpoint of social science, dependency relates to the condition in which support comes from the public or sources outside the family.

V. Of the men retired from active work about 5 out of 6 gave as the cause of retirement some physical or mental disability. The mental standing of those interviewed appeared to be high. In this respect there was a marked contrast with the opinions of those who at the same time reported on the inmates of institutions where paupers were being cared for. Here it was said that mental deficiency was probably the greatest single cause of dependency, especially among women.

VI. Men of native birth were found to occupy relatively a better position than men of foreign birth. Those who had commenced work permanently before the age of 14, that is, those whose opportunities for education were lessened by the necessity of working, were in poorer economical condition than those who first commenced to work at a later age.

VII. The opinion is expressed that the aged in rural and town communities are of better financial condition than those of the same ages in the city.

VIII. Nearly half of those interviewed (6688 out of 13,785) were persons of the age group 65 to 69, the remaining being in higher age groups. The favourable deductions made after examination of the whole group depend to quite an extent on the inclusion of such a large number of individuals of a low and very favourable age group.

EPIDEMIOLOGICAL REPORTS—LEAGUE OF NATIONS

In the monthly Epidemiological Report of the Health Section of the League of Nations, January number, summaries and comparisons of the prevalence of certain communicable diseases in 1926 and 1927 are given.

Encephalitis Lethargica is distinctly less prevalent throughout the world. Since the maximum in 1924, in England and Wales and Scotland, there has been a steady decline in the annual number of cases. In the United States and Canada, the incidence has decreased to such an extent in recent years, that the disease is no longer shown in the weekly returns of the United States Public Health Service.

Poliomyelitis in 1927 in the United States and Canada has been far above the usual prevalence. Provisional returns for United States for 1927 show 9736 cases in comparison with the 2175 cases reported in 1926. Canadian data indicate as marked an increase.

Diphtheria was more prevalent in 1927 than in 1926. "The increase was general from the far North to the extreme south of Europe and was noted also in countries of the

Mediterranean coast of Africa. The increase did not occur in the form of sudden epidemics, but showed as a slow moderate increase beginning in late summer and reaching its peak in most countries in November." In America the increase was marked early in the year and towards the end of the year the incidence decreased to a nearly normal rate.

Scarlet Fever, in contrast to *Diphtheria*, showed no general movement common to all European countries. Some countries recorded increases and other countries decreases. On the American continent a smaller number of cases was reported than in 1926.

Influenza, judging by reported cases and deaths, in December, shows no indication of assuming serious epidemic proportions. While Scotland and Ireland report more deaths in December 1927 than December 1926, the reports in general throughout Europe and America show a decrease.

VITAL STATISTICS OF AN INSURED POPULATION

The number of deaths among the 18,000,000 policy-holders of the Metropolitan Life Insurance, 1,000,000 of whom are in Canada, during the year 1927 indicate that the year has been an exceptionally favourable one, the most favourable since records were kept. These policy-holders are very largely members of industrial groups from the United States and Canada.

The crude death rate during the year was the surprisingly low one of 8.4 per thousand, this rate repre-

senting 147,520 deaths from the whole group. The very remarkable change which the figures indicate is perhaps best expressed by saying that, had the rate experienced in 1911 applied in 1927, not 147,520 but 220,090 persons would have died. It would be interesting indeed to know to what degree the age grouping of the policy-holders included conforms to the age grouping of a standard or general population. It should always be remembered that since a death rate is a constant multiplied by the number of deaths divided by the population, it therefore reflects the population as it does the deaths. In a normal or general population it is doubtful if a death rate of 8.4 can be long maintained since the individuals comprising it are constantly moving on into the higher age groups in which deaths are no longer deferrable. Only by continually increasing the population of the younger age groups of a lesser mortality can such a position be long maintained.

The great drop in the death rate has been followed as will be understood by a corresponding improvement in the expectation of life. This is now 8.39 years greater than it was during the period when the death rate approached 12.5 per thousand, namely, about 15 years ago. The difference between the population of the industrial group referred to, and the general population is best brought out by the statement that whereas in the industrial group the expectation of life has gained 8.39 years, in the general population the gain has been but 4.70 years.

Specifically and with reference to certain diseases among the outstand-

ing features is a great improvement in the tuberculosis mortality. The rate stood at 93.5 per 100,000 for all forms of the disease during the year. This is, in that group of policy-holders a reduction to a point less than half of what it was ten years ago. Will it be down another half in the next ten years? Perhaps not, in face of the law of diminishing returns and the absence of a specific therapy. There have also been very marked reductions of the measles, scarlet fever and whooping cough mortality.

On the other hand, cancer deaths are such as to give a new high rate. The rate, 73.5, while not so high as those reported from a number of general populations, has been showing

a tendency to rise and will doubtless continue to do so. The diabetes rate is also relatively a high one, apparently stabilizing after the low rate experienced following the introduction of insulin. There are indications, too, that this disease is becoming more prevalent.

Especial attention is drawn to the increased number of accidental deaths, especially those occurring as a result of automobile accidents. In respect of other accidents, in industry and the home, there has been improvement not wholly compensating for the above noted increase. The same period which has seen the halving of the tuberculosis rate has seen the automobile deaths double.

LABORATORY SECTION

G. B. REED, Ph.D. and C. M. ANDERSON, M.D.C.M., C.P.H.

BACTERIAL DISSOCIATION

ONE of the most significant developments in bacteriology during the last five to eight years is recognition of the somewhat cryptically styled microbic dissociation. References to variation in bacteria go back to some of the earliest publications in the subject, but in a number of recent investigations variations have been followed in much greater detail, and it has been demonstrated that certain of the variants exhibit a considerable degree of permanence, and differ from the parent strains not only in form but also in their biochemical behaviour, virulence and immuno-

logical properties. The subject has been reviewed periodically but most recently and comprehensively by Dr. Philip Hadley* of the University of Michigan in a monograph of some three hundred pages and more than five hundred bibliographical references. The present purpose is not to review this admirable paper but to draw the attention of the laboratory worker to certain phases of the subject observable in every day culture operations.

The subject in its modern sense may be said to have had its beginning in the work of Arkwright in England,

*Hadley, Philip, *Microbic Dissociation*, Jour. Inf. Dis. 40. 1,312. 1927.

of Cowan in Canada and England and of De Kruif in the United States. These investigators working respectively with intestinal bacteria, *Streptococci* and *Bact. leprosepticum* observed that the organism grown on suitable solid media consisted of two or more types of colonies. The two more definite types Arkwright styled Smooth and Rough. The parent strain of "normal type" is generally Smooth, the variant which occurs either frequently or with great rarity the Rough. Other terms have been used for these more extreme types of colonies and for the five or six intermediate types which have been recognized by various investigators.

Perhaps the simplest observed case is that in which the reaction takes place in cultures in fluid media. If the growth of such a dissociating culture is streaked on suitable solid media the Smooth together with the Rough or other variant colonies may be observed, as they grow up. Such observations have repeatedly been made with many species of bacteria in fluid cultures from serial single colony transfers or from single cell isolations. In other cases colonies on solid media which initially present the characteristics of the "normal type" gradually develop from the top or margin of the colony Rough or other variant colonies, while surrounding colonies continue to show the normal Smooth form. Subcultures from these mixed colonies ordinarily develop both Smooth and Rough colonies. Many routine cultures have been discarded as contaminated where in reality they contained not foreign organisms but variants from the normal parent type.

Associated with these more or less readily distinguishable colony forms are other and more significant characteristics which distinguish the variants from the normal type. Certain biochemical reactions usually proceed at a slower rate in cultures of the variants. In pathogenic species the variants usually exhibit conspicuously less and in some cases complete loss of virulence; the normal types have been found more commonly in active disease and in acute infections while the mutant types have been found more commonly in carriers, convalescents and chronic infections. De Kruif, for example, has clearly demonstrated that the very active rabbit parasite *B. leprosepticum* dissociates into a smooth colony form highly virulent for rabbits and a rough colony form of low virulence or completely lacking in virulence. At the same time the low virulent or avirulent type when injected into rabbits produces a high degree of immunity against the virulent type. Variations which are in many respects comparable have been observed in the *Streptococci*, *B. typhosus*, the para typhoids, *B. dysenteriae*, *B. diphtheriae*, and several other species.

The subject is too new and its literature too crowded with detail to permit of an estimation of its ultimate value at this time, but even already the subject has advanced to the stage where the practical laboratory worker must at least consider its bearing upon his culture procedure, and where the theoretical bacteriologist, the immunologist and the epidemiologist may indulge in new fields of speculation.

SOCIAL HYGIENE

A. M. DAVIDSON, M.D. and G. P. JACKSON, M.B., D.P.H.

"Vaccination Controls Smallpox," just issued by the Canadian Social Hygiene Council, is the first of a series of short pamphlets dealing with various preventable diseases. In the form of questions and answers, written as simply as possible, it deals with the history of the disease and the beneficial results which have followed strict attention to vaccination.

The ravages of smallpox in past centuries are first described with special attention to the inroads the disease made in early Canada. There is a brief summary of Quebec's method of dealing with smallpox, following the disastrous Montreal epidemic of 1885.

Stressing the harmlessness of vaccination, the pamphlet quotes Col. J. A. Amyot's summing-up on the value of the procedure in the Canadian army and notes that it was carried out without the slightest ill effects resulting. Dr. Victor Heiser of the Rockefeller Foundation is also quoted on the situation in the Philippines where ten million persons were vaccinated and a death toll of approximately forty thousand annually reduced to the vanishing point.

To demonstrate the proven effectiveness of vaccination the details of the Windsor epidemic of 1924 are given. A serious epidemic was stamped out in a few days "like turning off a tap" by general vaccination. Specific cases are given where unvaccinated members of a family died and vaccinated ones,

exposed to the disease, remained unharmed.

Published both in English and in French, the pamphlet is clearly intended as an educational aid to health officers engaged in creating favourable public opinion for vaccination and particularly, in localities where there has been trouble from the agitations of anti-vaccinationists. It has already been widely used as an informative bulletin for school children.

Parent Education—"Habit Formation," "Sex Education" and similar topics are the outstanding features of a course of four lectures on "Parent Education" now being issued by the Canadian Social Hygiene Council.

These are for use with study groups, Home and School Clubs and special gatherings under the auspices of local Councils.

In the first lecture, considerable emphasis is laid on the responsibilities of the home.

"Parents are too much absolved to-day," the lecture states "from responsibility and have been accustomed to pass on their responsibilities to others, for example, to the school teachers.

"Parents must be taught to realize once again that the producing of children brings with it a great responsibility on the part of the parents to themselves, to their children, to the world around them and to future generations. If we suppose that the child, until he goes to school, is under the care of his mother, then she

cannot avoid responsibility for his habits, for the important habits are all formed before six years of age."

The course is a general one with one lecture devoted to health problems in particular and moving pictures also utilized, along with the speaker, where that is possible.

Venereal Diseases—Diagnosis and Treatment, this booklet, issued by the Department of Health, Canada, and known as publication No. 23, was compiled by the medical committee of the Canadian Social Hygiene Council and has now been distributed to every physician in Canada in the hope that many practitioners may be helped in the handling of problems presented by these diseases.

The publication deals in detail with

the history, diagnosis and treatment of Syphilis in its various manifestations.

Gonorrhoea, in the male and female is dealt with under a separate section.

The public health aspect of the venereal diseases constitutes another chapter of the booklet and shows what the Departments of Health and the Canadian Social Hygiene Council are doing for the control of these diseases.

The last chapter is devoted to the explanation of the methods used in the diagnosis and treatment.

While the publication can in no way be regarded as a text-book on these diseases it is felt that a close perusal of it will be of benefit to those who have to diagnose and treat them.

NEWS OF NATIONAL VOLUNTARY HEALTH AGENCIES

JEAN E. BROWNE, REG.N.

THE CANADIAN TUBERCULOSIS ASSOCIATION in 1923, chose Three Rivers, Quebec, as a centre in which to apply some of the principles practised in the Framingham demonstration. Its population is industrial, seven-eighths Roman Catholic in faith and mostly speaking French. Iron, cotton textiles and pulp and paper manufacture are its leading industries. Cap de la Madeleine, an adjoining municipality of over 7,000 population, was included, making a total of 35,000 people exclusive of the surrounding agricultural population which has contributed 2110 people

for chest examination, of the total of 12,929 examined up to September 1927.

The demonstration was financed by receiving \$25,000 from the Canadian Red Cross Society, \$25,000 from the Federal Government, \$12,500 the first subscribed, from the Sun Life Assurance Company of Canada, and \$62,500 from the Provincial Government of Quebec, the city of Three Rivers and the citizens undertaking other responsibilities which were not fixed. Each doctor in Three Rivers and Cap de la Madeleine has whole-heartedly co-operated and re-

ferred cases to the dispensary, as well as 49 doctors in the surrounding territory, making 88 physicians in all. One hundred and thirty-five cases with positive sputum have been diagnosed and 661 other cases of tuberculosis (all forms) have been diagnosed with negative sputum. Of 965 people referred by physicians from factories 56 cases of tuberculosis have been diagnosed.* Tuberculosis cases totalling 124 have been hospitalized in four years, none previously. The average of the death rates for four years has been 78 per 100,000 compared with 135 for the five year period immediately preceding.

THE CANADIAN COUNCIL ON CHILD WELFARE, reports some 1927 activities as follows:

Child Health

The distribution, in co-operation with the Provincial Departments of Health, in 9 provinces of Canada, of 5069 sets of pre-natal letters, to expectant mothers. These letters are issued in both English and French.

The distribution of 10,000 sets of Diet Folders, dealing with the nutrition of the child from birth to school age.

The distribution of 11,000 sets of Well Children Examination Forms.

The distribution of thousands of copies of child health posters, stories, etc.

Child Care and Protection

A survey of the child-caring agencies and legislation in the province of British Columbia, resulting in constructive re-organization of Vancouver's child welfare work.

A special study and investigation of the problem of juvenile immigration, which it is hoped will lead to constructive developments in this field.

The establishment at Ottawa, of Shernfold School, a private residential school, providing for a limited group of little girls (15) in need of special care and training. In this undertaking the Council was indebted to the Canadian National Committee on Mental Hygiene for counsel and assistance.

The establishment of a Children's Bureau, at Ottawa, for the co-operative investigation and treatment of problems of child care. Eight agencies of different racial and religious affiliations are working through the Bureau.

The inauguration of a special study of "repeaters" among boy delinquents. *New Publications issued in 1927*

Quarterly—The Canadian Child Welfare News. A Guide to Your Reading on Child Welfare Problems. Teaching International Relationship (to Children). The White List of Motion Pictures Children Will Like. Canada and the World's Child Welfare Work. Study Outlines of Some Child Welfare Problems. The Story of the Curlytails. What is Malnutrition? The Home Training of the Blind Child. The Juvenile Court: 1. in Law, 2. in Action.

THE JUNIOR RED CROSS is a voluntary organization through which children and young people find opportunities for self-expression; the motive

which it brings into any class room appeals to the imagination and will of children in such a way as to transmute knowledge into action; this motive is being specially used by those who are directing the movement to promote health, to develop the altruistic tendencies in children, to give practice in good citizenship and to cultivate international friendliness among the children of the world; it is not a method of education, or health education, but it is a free spirit which quickens the life of the whole school in which it is organized.

This definition, proposed by the Canadian delegate, was accepted by the Educators' Conference convened by the League of Red Cross Societies in 1925, and has been accepted by the 40 national societies that have Junior Red Cross Societies. The world membership of Junior Red Cross is now over 10,000,000 young people. These members are pledged to put into practice the rules of healthy living and to help others, particularly other children, who need their help. They are also developing, largely through the scheme of international correspondence, a real friendliness with their comrades in other countries of the world.

In Canada Junior Red Cross is organized in each of the nine provinces with the endorsement of the provincial departments of Education. It is being carried on in 5744 class rooms with a membership of 148,002.

Although it is impossible to record with accuracy the number of children in the Junior Red Cross who are improving their own health and that of others by the enthusiastic practice

of "The Rules of the Health Game," still all those who are in touch with the work know that this aspect is gaining in momentum, from year to year. Constantly one hears of groups establishing hot school lunches, of drinking milk but no tea or coffee, of insisting on having vegetables and fresh fruit where possible in their dietary. Very often milk is bought for poor families in the community who can't afford to have it regularly for their children. Seldom (in fact one can almost say, never) do you find a child who wears the Junior Red Cross membership button anything but clean. Open windows are part of the members' creed and even the very little Juniors are vigilant in their proper use of a handkerchief. The older Juniors carry this personal hygiene over into the field of school hygiene, and we find sanitation and cleanliness committees whose duty is to see that school grounds, outhouses, and the interior of the class room are all kept scrupulously neat and clean. Other committees look after the ventilation of the class room and still others adjust the desks and seats under the direction of the teacher.

In 1927 the Juniors of Canada paid for treatment for 906 handicapped children. Their other service activities are far too numerous to mention in this limited space. It is interesting to note that since the beginning of the peace-time programme to the end of 1927, 6209 handicapped children have been treated in Canada through funds raised by the members of the Junior Red Cross. This number does not include dental cases.

BOOK REVIEWS

D. T. FRASER, B.A., M.B., D.P.H. and R. R. MCCLENAHAN, B.A., M.B., D.P.H.

Modern Methods of Nursing. By Georgina J. Sanders, formerly Superintendent of Nurses at The Philadelphia Polyclinic Hospital (W. B. Saunders Co., Philadelphia and London). Price \$4.00, 354 pp. 1927.

This is a new edition of Miss Sanders' very valuable book on the theory and practice of the profession of nursing. One of the great advantages of the previous editions of this book has been the brevity and clearness with which the material has been presented. This conciseness has been maintained in the present edition, which makes it an admirable book for student nurses who have not yet had time in the majority of training schools for very extensive reading. Especially useful is the chapter on elementary Bacteriology and the theories of Immunity. While, as Miss Sanders says in her preface, these chapters are not intended to be used as text-book material yet, by their clearness and brevity they present this very essential knowledge to the student in a clear fashion. This edition has been brought up to date by articles on the Schick and Dick Tests and on the newer diagnostic methods. The explanations of the methods employed are particularly lucid.

In describing the technique of the various nursing procedures Miss Sanders is most practical. In no procedure is there any detail described which could not or should not be done for the patient. The student

is also told very concisely and simply, "the why and the wherefore." One is very glad to see this book of Miss Sanders brought up to date.

G. H.

Fresh Air and Ventilation. By C.-E. A. Winslow. E. P. Dutton & Company, New York, 1923. 182 pp. Price \$2.00.

In this book, Professor Winslow, the chairman of the New York State Commission on Ventilation, gives to the general public an interesting summary of the modern views on ventilation. The old, but somewhat persistent theories that the vitiation of air is the result of either a deficiency of oxygen or an excess of carbon dioxide are mentioned and refuted, for it has been now established that the evil effects of such air are due to physical causes, *i.e.*, overheating, abnormal humidity and lack of air movement. Noxious odours may be harmful to the extent of reducing the appetite and the capacity to do work.

The results of a long series of experiments on the best type of ventilation for schools are discussed. The commission concluded that if there was an exhaust duct near the ceiling on the inside wall, opening the windows from the bottom provided a suitable exchange of air. In addition the radiators should extend the full length beneath the windows and suitable deflecting boards should be placed across the lower part of these windows. Children working in such

rooms were both more comfortable and more healthy than those in rooms ventilated by fans. The abolition of the fan system would save much expense. The air circulation problems in homes, factories and auditoriums are also briefly discussed.

In the chapter on factory ventilation a short review of most of the important industrial poisons is given, along with methods of combating them.

E. C. R.

BOOKS RECEIVED

Epidemic Influenza. Edwin O. Jordan, Ph.D., Sc.D., Professor of Hygiene and Bacteriology, University of Chicago. Cloth. Price \$5.00. Pp. 599, with 98 illustrations. Chicago, American Medical Association.

Interpreters of Nature. Sir George Newman, K.C.B., M.D., D.C.L., LL.D., Chief Medical Officer, British Ministry of Health. 296 pages. Price \$4.50. Oxford University Press, American Branch, N.Y. 1927.

Principles of Sanitation. C. H. Kibbey. 354 pages, 34 illustrations. Price \$4.00. F. A. Davis Co., Philadelphia, 1927.

Pernicious Anaemia. Beaumont S. Cornell, M.B. Fellow in Duke University, Duke University Press, Durham, North Carolina, 1927. 311 pages.

NEWS AND COMMENTS

P. A. T. SNEATH, M.B., D.P.H.

ASSOCIATION NOTES—It is planned to hold the 1928 Meeting of the Canadian Public Health Association in the City of Winnipeg, during the week of October the 8th. As this is the first occasion on which the Association has met in the City of Winnipeg, and, in view of the very hearty invitation extended by both the City and Provincial Health Authorities, it is hoped that the attendance will be a very large one. You are asked to note that there is no conflict with the Meeting of the American Public Health Association, who are holding their sessions the following week in the City of Chicago. It will be possible for those

so desiring, to attend both Meetings with the minimum amount of inconvenience.

The following Standing Committees have recently been appointed by your Executive Committee:

Committee on Quarantine; Committee on Milk; Committee on School Sanitation; Committee on Immunization.

The personnel of the various Committees has not, as yet, been completed, but it is hoped that they will be sufficiently well advanced in their investigations to present at least an interim report at the Winnipeg Meeting.

Announcement has been made of the formation of the Alberta Public Health Officials' Association, composed of the medical officers of health within the Province, and the Provincial Health Department. The annual meetings are to be held at the same time and place as the Alberta Hospitals' Association and the Alberta Association of Registered Nurses, with which the new Association is amalgamated. Dr. T. H. Whitelaw, Medical Officer of Health of Edmonton, was elected President, and Dr. Jenkins, Provincial Medical Inspector, Secretary-Treasurer.

The following resolution was adopted at a meeting of the Provincial Constituency Association Convention of the United Farmers Association of Alberta: . . . "That this Convention is in favour of the Provincial Legislative Assembly adopting an Act which is as far as possible a duplication of the Medical Act of Great Britain; and we recommend that the Minister of Health and a Committee from the Legislature be appointed, and that they secure such data and information as may be necessary to accomplish this purpose;

And be it further resolved:

That such a law be enacted and put into force at the earliest possible date."

An Association of Industrial Physicians in Quebec was organized recently in Montreal to advance the interests of industrial medicine. Dr. A. R. Pennoyer was elected President, Dr. Harold Hibbert head of the Department of Industrial Chemistry

at McGill University, and Dr. G. H. Hamel as Vice-presidents, and Professor F. G. Pedley as Secretary.

The Child Welfare Division of the Department of Health, Canada, following its publication of "Maternal Mortality in Canada" which is the result of the collection of data on that subject since 1925, has issued two new booklets in The Little Blue Book series, presenting information on the subject for popular consumption. These booklets by Dr. Helen Mac-Murphy are both entitled "Mother," one being for women, and the other for men. The facts are presented in concise and readable form with much useful advice and information. Both booklets should be found in all Canadian homes and may be obtained on request to the Division of Child Welfare, Department of Health, Ottawa.

The grand council of the British Empire Cancer Campaign announce an international convention on cancer research to be held next July in London. Sir John Bland Sutton, Past-President of The Royal College of Surgeons has accepted the position of president of the Convention, with the following as chairmen of sections: Sir Thomas Horder, Diagnosis; Prof. Lazarus-Barlow, Pathological section; Sir Charles Gordon-Watson, Surgical Treatment; Prof. Sidney Russ, Roentgenological Treatment; and Lieut.-Col. F. E. Freemantle, Public Health and Statistics. Invitations are being sent to all parts of the world to those closely associated with research into the cancer problem.

The Nova Scotia Tuberculosis Commission is doing excellent work throughout Nova Scotia under the direction of Dr. Joseph Hayes. The Commission travels from place to place, assisting and stimulating the local municipalities to meet adequately the problem of tuberculosis. Indications are that further provision for tuberculous cases will be made by several of the general hospitals, and that increased interest is being aroused in many municipalities.

The Annual Conference of the Public Health Nurses Department of the Manitoba Provincial Board of Health was held in the Parliament Buildings, Winnipeg, December 27th to 30th. The opening addresses were given by the Honourable Dr. E. W. Montgomery and Dr. M. S. Fraser. The following papers were presented: "Problems in infant care," Dr. O. J. Day; "Goitre with special reference to children," Dr. Tahrni; "Maternal Welfare," Dr. E. M. Douglas; "The Pre-School Child," Dr. Bruce Chown; "Cancer, a public health problem," Dr. N. J. McLean; "Maternal and Infant Mortality," Dr. Ross Mitchell.

Major Leonard Darwin, in a letter to the London Times advocates the teaching of biology in schools with particular emphasis on Eugenics, since the intelligent public are now fully aware of the vital national importance of heredity. He contends that not only is such knowledge necessary in agricultural work, but that all aspirants for national leadership both at home and abroad should be fully cognizant of the laws which underlie human life and evolution.

A Conference on Puerperal Morbidity and Mortality, called by the British Medical Association at Association Headquarters, met in January to discuss the Preventive Aspects of Midwifery, Dr. T. Watts Eden presiding. The following papers were delivered: "Co-operation of Medical Practitioner and Midwife," by Dr. J. S. Fairbairn; "Bacteriological Investigation," by Dr. Leonard Colebrook; "Midwifery and The General Practitioner," by Dr. C. E. Douglas; and "The Role of the Medical Officer of Health," by Dr. Brunston Brewer. Extracts of the papers and discussion thereon are to be found in the Supplement of the British Medical Journal of February 4th, 1928.

The first International Congress of Mental Hygiene is to be held in Washington, D.C., in April 1929. The decision to hold this was reached last June at a meeting of the Organizing Committee in Paris consisting of delegates from fourteen countries. It was also decided that the International Committee for Mental Hygiene should be formally founded at one of the sessions of the Congress, and that Mr. Clifford W. Beers, who has been in charge of the work of the Organizing Committee, should be appointed permanent Secretary-General of the International Committee on its establishment. It was agreed that the secretariat will be in the United States, thereby enabling Mr. Beers to continue as secretary of the American National Committee for Mental Hygiene with headquarters in New York.

CURRENT HEALTH LITERATURE

A Selected Public Health Bibliography with Annotations

RUGGLES GEORGE, B.A., M.B., D.P.H.

Health Examinations—A study of 2500 physical examinations of applicants for admission to Antioch College indicates that the main defect in periodic health examinations, as they are conducted to-day, lies in the fact that the examining physician is still more interested in advanced symptoms of manifest disease than in those lesser disorders of function which call not for curative treatment but for prophylaxis.

EARP, J. R. Health Examinations and the Physician. *Journal of the American Medical Association*, February 4, 1928, page 384.

Maternal Mortality in Canada—The report of an enquiry made by Dr. Helen MacMurchy, Division of Child Welfare of the Dominion Department of Health, for the year ended July 1, 1926. This report was made at the request of The First Conference on Medical Services in Canada arranged by the Canadian Medical Association.

Maternal Mortality in Canada, Publication No. 37. Department of Health of Canada, Ottawa.

Maternal Mortality—The Department of Health of Canada has issued two booklets on the prevention of maternal mortality. One of these is for women (Publication No. 38) and the other for men (Publication No. 39). Copies of these may be obtained upon application to the Department of Health of Canada, Ottawa.

Mothercraft—Channels through which Mothercraft is taught and the methods of teaching.

BRODIE, M. G. The Practical Teaching of Mothercraft. *Hospital Social Service*, January 1928, page 55.

Hospitals and Public Health—A consideration of the general hospital not as a repair shop but as a health centre and training school for health.

KLEINSCHMIDT, H. E. The Hospital's Stake in Public Health. *Hospital Social Service*, January 1928, page 1.

Prevention of Rickets—An illustrated account of the campaign against rickets conducted by the Mulberry Health Centre in New York City.

PRICE, C. R. Launching a Campaign against Rickets. *Trained Nurse and Hospital Review*, January 1928, page 56.

Artificial Respiration—Detailed instructions for artificial respiration by the prone pressure method, issued by the United States Public Health Service.

Public Health Reports (U.S.P.H.S.), January 20, 1928, page 111.

Infant Care in Manitoba—A description of the Manitoba Provincial Programme of Infant Care by the Assistant Director of Public Health Nursing Branch of the Manitoba Provincial Board of Health.

WELLS, Anna E. The Provincial Programme of Infant Care. *The Canadian Nurse*, February 1928, page 72.

